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Influence of Type of Ground Operation on the Wounded in Action, U. S. Divisions in World War II*

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(With one illustration)

THE SYSTEM of forces generating battle casualties is so complex that their recorded incidence is extremely variable and their accurate forecasting beyond expectation. And yet the incidence of battle casualties in a particular operation is always important from the logistic standpoint and usually so from the tactical standpoint as well. Although no analysis of existing data on battle casualties will surely provide the basis for an accurate forecast in any future operation, there are certain elementary relationships in recorded casualty data which are useful to those whose responsibility it is to plan either the tactical or the logistic aspects of military operations. Such factors as arm or service, military occupational specialty, echelon, and the tactical situation, for example, have been observed

to bear very definite relationships to the incidence of battle casualties. Discussions of these factors were, therefore, included in the compilation of World War II Army data in *Battle Casualties*,¹ together with descriptive data on individual campaigns and frequency distributions of casualty rates. In preparing that material for publication there was developed a classification of ground operations with higher than average casualty rates, and World War II casualty data were reviewed in the light of this classification. It was possible to bring into the classification of six types of ground operations about 27 percent of the total wounded or injured in action sustained by U. S. Army ground troops in World War II, and about 30 percent of the total sustained by the U. S. Marine Corps. Since only a brief summary could be given in *Battle Casualties*, it is the purpose of the present article to provide the underlying data.

METHODS AND SOURCES

The chief sources used in selecting the types of operations and the units involved were the after-action reports, historical reports of tactical units, and such special reports as campaign summaries, various staff

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journals, and operational reports. Many of these sources also reported unit casualties in considerable detail. In most instances, however, cumulative counts of casualties were given for either the complete campaign or various chronological phases, and were often found to be too inclusive for the present analysis. In certain instances in the Pacific, when it was necessary to use these sources for counts of the wounded, the strength to which they were related was perforce derived from still another report. To avoid this difficulty, preference was often given to available counts of wounded reported in the weekly Statistical Health Report (WD AGO 8-122, formerly WD MD 86ab) which also provides average strength. For U. S. Army divisions operational in the European Theater of Operations during World War II the Statistical Health Report, supplemented by the daily Combat Medical Statistical Report (ETO USA MD Form 323), was used almost exclusively. For units in the Mediterranean Theater the Statistical Health Report was supplemented by daily tabulations of AG casualty cards. Statistical Health Reports were by no means complete for U. S. Army divisions in the Pacific Theater. The excellent XXIV Corps Medical Reports of the Leyte and Okinawa operations were found to contain comparable data on a daily basis, and were extensively used. Use was also made of the individual division G-1 daily report of strength and casualties. The data for U. S. Marine Corps divisions were obtained from preliminary machine tabulations of U. S. Marine Corps casualties by day of occurrence.

In using the weekly Statistical Health Report difficulties were occasionally experienced in subdividing a divisional report for a particular week into the two portions of interest, e.g., the beachhead operation and thereafter. Wounded were divided between the two periods on the basis of the corresponding daily counts of wounded obtained from the respective supplementary reports.

The dates selected to terminate certain operations must necessarily be arbitrary.

However, in general the chronology of various phases of operations or campaigns, including the dates when combat units were committed or relieved, is so well documented that the selection of a particular date rarely seemed arbitrary, and always involved no more than a choice among alternative dates provided by conflicting sources. Beachhead operations, however, posed a special problem with respect to dates of termination. Because of the inherent variability in this particular type of operation, characterized by assault landings on land masses of various size and with peculiar features of terrain, terminal dates of the beachhead phase of such assaults were less well defined, especially when the area involved was small. For example, on certain of the Pacific islands the beachhead could not be considered secure until almost all resistance had been overcome.

No attempt was made to evolve a classification of all ground casualties, or to go beyond U. S. experience in World War II. Interest in such a classification arose initially from the observation, early in World War II, that beachhead operations were often quite hazardous. It was thought that the development of estimates for such operations in World War II would be very useful, and activities along these lines rapidly led to efforts to characterize other kinds of operation in which the rate for wounded in action might be high. The final choice of types of operation reflects the U. S. divisional experience of World War II both in Europe and in the Pacific. It is also greatly influenced by the character of World War II after-action reports, campaign summaries, and related documents describing ground operations. The types selected for study are as follows:

- Beachhead operations.
- Offensive breakthrough operations.
- Reduction of ports and towns.
- Assaults on fortified lines.
- River crossings.
- Defensive operations.

Another class which might have been chosen

is comprised of operations of pursuit, in which the enemy, driven from an initial position, is pursued until he can stand on a secondary prepared line, or can regroup, perhaps with reinforcements, in sufficient strength to make a stand. Large-scale holding operations might also have been defined as a separate class, and still other examples might be suggested. Those which were considered but not finally adopted either seemed unlikely to yield high rates for wounded in action or failed to lead to explicit criteria which could be satisfied by operational reports available for study.

BEACHHEAD OPERATIONS

Beachhead operations were among the easiest to define, but the characteristics of those chosen by no means exhaust the possibilities for future operations of this type. Primarily airborne attacks were excluded, but in combined air and overwater assault,

such as led to the establishment of the Normandy beachhead, the airborne infantry divisions were included. River crossings were excluded except where rivers were part of the natural features of a beachhead, as was the case on Leyte. The class comprises combined naval and ground operations directed against a hostile shore with the intent to secure a forward position capable of reinforcement and forward displacement. Wounded among air and naval personnel are, however, excluded. The specific operations chosen to represent this class are all *successful* beachhead operations. There are no repulsed landings or abandoned beachheads among United States ground actions in World War II. Selection of terminal dates for beachhead operations posed the special problem already discussed. The shortest time given for any of the eight beachhead operations studied here (Normandy, Salerno, Anzio, Leyte, Okinawa,

TABLE 1
FREQUENCY DISTRIBUTION OF DIVISION-PERIODS BY WIA RATES, BY TYPE OF OPERATION

Wounded per 1,000 men per day	Type of operation					
	Beachhead	Offensive break- through	Reduction of ports and towns	Assaults on fortified lines	River crossings	Defensive
0 - 1.9	2	1		6	7	8
2.0- 3.9	2	4	4	16	11	28
4.0- 5.9	6	5	11	7	12	13
6.0- 7.9	3	2	5	7	7	5
8.0- 9.9	2		2	2	2	3
10.0-11.9	1	1	1	6	2	3
12.0-13.9		1		2	2	1
14.0-15.9	1	1				2
16.0-17.9	2					
18.0-19.9	1					
20.0-21.9		1		1		
22.0-23.9	1					
24.0-25.9	1					
26.0-27.9						
28.0-29.9						
30.0-31.9	1					
32.0-33.9	1					
Total	24	16	23	47	43	63
Mean						
Unweighted	11.1	7.1	5.7	5.9	5.0	4.6
Weighted	11.0	7.1	5.9	5.1	5.0	3.7

CUMULATIVE PERCENTAGE DISTRIBUTIONS OF AVERAGE DIVISIONAL WOUNDED RATES BY TYPE OF OPERATION, WORLD WAR II

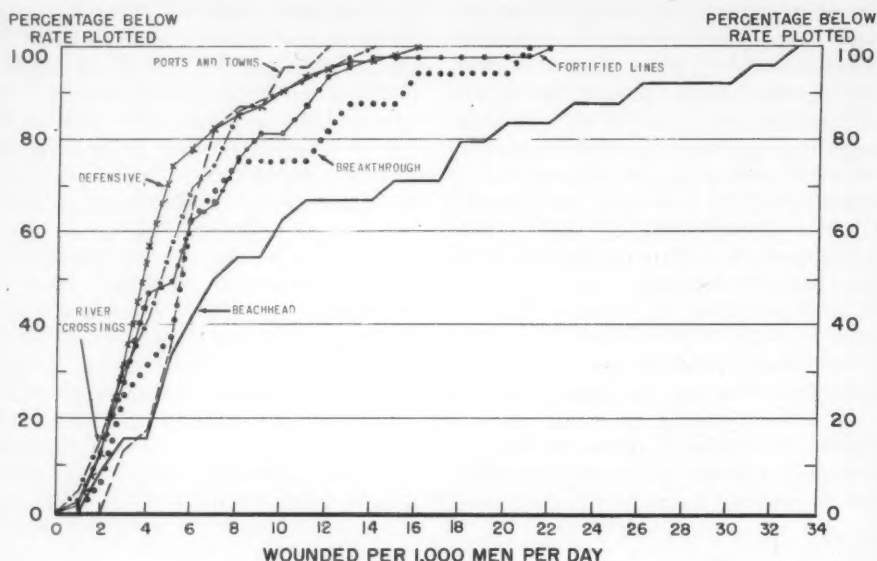


FIGURE 1

Tarawa, Iwo Jima, and Saipan) is three days for Anzio and the longest 11 days for Leyte. Anzio presented a particular problem in that the most severe test of the security of the beachhead did not occur until a month after the initial landing, and expansion was not possible for three months. However, after three days the beachhead was reinforced at will, hospitals were taken ashore, and initial counterattacks were repulsed; if its security was in doubt it was because of uncertainty as to the magnitude of the counterblow the enemy must eventually make to dislodge the force. Leyte was unique in that the two Corps sectors (X and XXIV) of the beachhead were secured at different times. The right flank (X Corps) was secured within six days. In the XXIV Corps sector, where progress was slowed by jungle swamps and by the absence of any inland roads in some division areas, it was 11 days before the beachhead was declared secure. Notably absent from the list em-

ployed here are the landings in North Africa, the invasion of Sicily, and the attack on Luzon. These were omitted only because adequate casualty data were not at hand.

In the eight beachhead operations studied here 24 divisions participated for one or more days. For all divisions participating in each type of operation table 1 and its counterpart, figure 1, give the distribution of divisional WIA rates expressed as wounded or injured in action per thousand average divisional strength per day over the entire period of participation of each. These rates range from 1.47 to 32.25, and their arithmetic mean is 11.1. By way of comparison it may be useful to point out that this average rate was exceeded by not more than one or two percent of the WIA rates for all division-weeks in combat in ETO. Since the average beachhead operation lasted 6.2 days, the rates are roughly comparable with those for division-weeks.

TABLE 2

WOUNDED IN ACTION DURING BEACHHEAD OPERATIONS, U. S. ARMY AND MARINE CORPS DIVISIONS, WORLD WAR II

Operation	Calendar period ¹	Number of divisions	Division days	Mean division strength	Wounded	
					Number	Rate ²
Tarawa	20-23 Nov 1943	1	4	17,000	2,193	32.25
Saipan	15-19 Jun 1944	3	13	16,366	4,957	23.30
Iwo Jima	19-27 Feb 1945	3	25	16,360	6,323	15.46
Normandy	6-13 Jun 1944	6	42	15,217	8,677	13.58
Salerno	9-14 Sep 1943	2	11	15,818	905	5.20
Leyte	20-30 Oct 1944	4	34	17,964	2,502	4.10
Okinawa	1-4 Apr 1945	4	16	14,791	860	3.63
Anzio	22-24 Jan 1944	1	3	18,530	153	2.75
Total		24	148	16,256	26,570	11.04

¹ Inclusive dates within which one or more divisions in the sample contributed combat days to the indicated operation.

² WIA per 1,000 men per day.

The average rate for beachhead operations is given here as 11.0 and is a weighted mean obtained by weighting each individual divisional rate by the proportion of all man-days which it represents. The median rate is less, about 7.3. For each separate operation, e.g., Normandy, table 2 presents the weighted mean rate in a form permitting comparison with the others. Needless to say, these rates differ quite significantly*; that is, the individual operations differ by an amount far greater than chance would ordinarily produce. The numbers of wounded are so large that any statistical comparisons are quite sensitive, even to small differences in the rates. In consequence, each operation listed has its own unique WIA rate, different from every other. The variation serves as a reminder that very different rates are being averaged, and that planning will be improved to the extent that one can find a

model in past operations rather than rely on an average figure. The rate calculated for Tarawa, although higher than any rate thus far found for any other War II operation or for any division-week among the thousands which have been studied by the present authors, applies to a relatively small assault force (one Marine division).

OFFENSIVE BREAKTHROUGH OPERATIONS

Offensive breakthrough operations proved difficult to distinguish from assaults on fortified lines. Three operations were chosen to represent this type: the breakthrough at St. Lô by the First Army in France; the Fifth Army's offensive at Cisterna, Italy; and the Fifth Army's final penetration of the German line before the Po Valley. It is characteristic of these large-scale operations that an enemy barrier, not necessarily fortified, resists pressure and denies advance until a final successful effort at penetration at one or more points is made. Again, therefore, only successful operations are included. Flanking movements and rapid penetrations of lightly-held territory are excluded: there must be containment of United States forces behind an organized line which is then pierced. Subsequent exploitation of the breakthrough is excluded. Any difficulties

* Specification of the best method of testing for significance presents difficulties. The method used here is a modified contingency-table approach, with the calculation of χ^2 and its interpretation in the usual manner. The modification consists in ignoring the number of men who were not casualties, and calculating only the contribution to χ^2 which arises from the observed and expected number of casualties. It is analogous to a test on the goodness-of-fit of a mathematical function to observed data.

TABLE 3
WOUNDED IN ACTION DURING OFFENSIVE BREAKTHROUGH OPERATIONS,
U. S. ARMY DIVISIONS, WORLD WAR II

Operation	Calendar period ¹	Number of divisions	Division days	Mean division strength	Wounded	
					Number	Rate ²
Cisterna	23-25 May 1944	4	12	18,091	2,063	9.50
St. Lô	25-28 Jul 1944	6	21	16,687	2,590	7.39
Po Valley	14-20 Apr 1945	6	33	14,313	2,767	5.86
Total		16	66	15,755	7,420	7.14

¹ Inclusive dates within which one or more divisions in the sample contributed combat days to the indicated operation.

² WIA per 1,000 men per day.

in the temporal demarcation of these operations concerns only their onset, as in instances in which an enemy line is under repeated or almost continuous assault. The examples chosen here are all from the campaigns in Europe and each has a well-defined onset. These offensives represent 16 division-periods averaging 4.1 days in length. Table 1 gives in detail the distribution of these division-periods, for which both the weighted and unweighted averages are the same, 7.1 wounded per 1,000 divisional strength per day. Plainly the several breakthrough operations, although characterized by high WIA rates, have a lower average rate than the beachhead operations. This cannot be shown by comparing the distributions of table 1, for on that basis the means of 11.1 and 7.1 do not differ significantly ($P > .05$). However, if weighted mean rates are compared, and the test based on observed and expected numbers of wounded in the fashion already described, the difference is clearly outside the chance range. The weighted mean rates for the several operations are presented in table 3. These differ quite significantly also, Cisterna being worse than St. Lô. It was also much worse than the landing at Salerno, which represents the most difficult beachhead operation in the Mediterranean.

REDUCTION OF PORTS AND TOWNS

Characterized primarily by encirclement and sustained assault on ports and towns

heavily fortified and defended, this type is exemplified by Cherbourg, St. Malo, Brest, Aachen, Metz, Nuremburg, Cassino, Lanuvio, and Manila. Metz represents a heavily defended fortress, its approaches guarded by a series of forts. Although the forts were considered to be an integral part of the city's defense, that part of the siege during which the forts were being contained has been excluded. Consequently, only the period from the start of the drive to capture Metz itself, until the final surrender of the city, has been included. Cassino represents an unsuccessful offensive operation in that it did not fall before the United States divisions engaged there, but fell later to the British. Only the United States experience is included here.

The array of operations comprises 23 division-periods averaging 12.7 days and about 25,000 wounded. Table 1 gives the frequency distribution of the 23 division-periods. It is less variable than the others and heavily concentrated in the interval of 4.0 to 5.9 WIA per 1,000 men per day. The unweighted mean of these 23 rates is 5.7, and the weighted mean 5.9. None of the rates is below 2.0.

The nine operations differ from one another quite significantly, the most difficult being St. Malo. The lowest rate for an entire operation is 4.63 for Nuremburg. Cassino, as might be expected from the fact that it is not representative of the entire period of siege and capture, lies just below the

average for all such operations. Table 4 gives the numerical details on the individual operations.

ASSAULTS ON FORTIFIED LINES

Attacks on single strong points, e.g., Aachen in Germany and Cassino in Italy (anchors of the Siegfried Line and of the Gustav Line, respectively) were omitted from the operations in this class and placed in the class of reductions of ports and towns. The penetration of the respective defenses of the Siegfried and Gustav Lines before these two cities, however, has been included. Hurtgen Forest, also an integral part of the Siegfried Line, was of far greater extent and intensity of combat, and hence is considered separately. The representatives of this easily defined class are: Gustav Line and Gothic Line, in Italy; Hurtgen Forest and the Siegfried Line, in Germany; the Yamashita Line, on Luzon; and the Machinato Line and the Shuri Line on Okinawa. Assaults on fortified lines were distinguished from certain offensive breakthrough operations by their greater extent, greater duration, and broader objective. About 47,000 wounded are covered by the seven assaults classified here. There were 47 division-peri-

ods averaging 13.6 days in length. The entire distribution of these 47 periods is given in table 1 in comparison with those for other types of operation. The unweighted mean is 5.9, considerably higher than the corresponding weighted mean of 5.1. There is great concentration in the range of 2.0 to 3.9 WIA per 1,000 men per day.

The seven individual operations vary greatly among themselves. The most costly, the assault on the Machinato Line on Okinawa, has a slightly higher rate than the landings in Normandy. Each major assault on a fortified line is shown separately in table 5 together with a summary for the entire type. The entire Siegfried Line assault took place over a prolonged period since the defenses were uncovered at different times in the three separate field army zones (First, Third, and Seventh). Undoubtedly there were times when the WIA rate exceeded 3.41 by far; individual division rates ranged from 1.12 to a high of 11.45. When Hurtgen Forest is included, the average WIA rate for the Siegfried Line is increased from 3.41 to 4.29 per 1,000 men per day. Nevertheless, the overall average resulted in either the lowest rate or next to the lowest rate in the set. Each of the other rates is different from the rest.

TABLE 4
WOUNDED IN ACTION DURING REDUCTION OF PORTS AND TOWNS,
U. S. ARMY DIVISIONS, WORLD WAR II

Operation	Calendar period ¹	Number of divisions	Division days	Mean division strength	Wounded	
					Number	Rate ²
St. Malo	5-17 Aug 1944	1	13	14,384	1,828	9.78
Lanuvio	26 May-3 Jun 1944	1	9	16,661	1,381	9.21
Cherbourg	19-27 Jun 1944	3	27	15,134	3,294	8.06
Brest	25 Aug-20 Sep 1944	3	81	15,319	6,941	5.59
Metz	8-22 Nov 1944	4	44	15,162	3,590	5.38
Cassino	1-14 Feb 1944	2	19	15,285	1,525	5.25
Aachen	7-21 Oct 1944	3	32	16,999	2,749	5.05
Manila	3-25 Feb 1945	3	56	11,018	3,028	4.91
Nuremburg	16-20 Apr 1945	3	12	14,458	803	4.63
Total		23	293	14,602	25,139	5.88

¹ Inclusive dates within which one or more divisions in the sample contributed combat days to the indicated operation.

² WIA per 1,000 men per day.

TABLE 5
WOUNDED IN ACTION DURING ASSAULTS ON FORTIFIED LINES, U. S. ARMY
AND MARINE CORPS DIVISIONS, WORLD WAR II

Operation	Calendar period ¹	Number of divisions	Division days	Mean division strength	Wounded	
					Number	Rate ²
Machinato Line	19-24 Apr 1945	3	18	10,794	2,762	14.22
Gustav Line	11-15 May 1944	2	10	18,012	1,984	11.01
Shuri Line	11-24 May 1945	5	59	13,159	7,466	9.62
Hurtgen Forest	13 Sep-7 Dec 1944	3	99	15,607	11,662	7.55
Gothic Line	13-22 Sep 1944	4	40	14,896	2,813	4.72
Yamashita Line	21-28 Feb 1945	2	16	11,398	706	3.87
Siegfried Line	12 Sep 1944-24 Mar 1945	28	399	14,334	19,517	3.41
Total		47	641	14,342	46,910	5.10

¹ Inclusive dates within which one or more divisions in the sample contributed combat days to the indicated operation.

² WIA per 1,000 men per day.

RIVER CROSSINGS

No difficulties were faced in choosing the major river crossings against enemy opposition: the Volturno (three crossings) and the Rapido in Italy; and the Moselle, the Roer, and the Rhine in France and Germany. All of these operations represent assaults against strong enemy resistance with the objective of establishing a secure bridgehead on a hostile shore. In most instances these river lines represented formidable obstacles, although the operations in this class were by no means the most costly. As may

be seen from table 1, in more than two-thirds of the river crossings the WIA rate was below 6 per thousand average strength per day, and both the weighted and unweighted mean rates are 5.0. Again individual operations varied widely, as table 6 shows, ranging from 0.91 in the second crossing of the Volturno to 7.16 for the Rapido. The Rapido was the most difficult of the operations in this class and its WIA rate is 38 percent higher than that experienced on the Salerno beachhead. The initial crossing attempts by the 36th Infantry Division

TABLE 6
WOUNDED IN ACTION DURING RIVER CROSSING OPERATIONS, U. S. ARMY DIVISIONS, WORLD WAR II

Operation	Calendar period ¹	Number of divisions	Division days	Mean division strength	Wounded	
					Number	Rate ²
Rapido	20-31 Jan 1944	2	11	15,743	1,240	7.16
Volturno						
1st crossing	13-14 Oct 1943	2	4	16,679	441	6.61
2nd crossing	18-20 Oct 1943	1	3	17,166	47	0.91
3rd crossing	3-4 Nov 1943	2	4	17,362	301	4.33
Roer	23-28 Feb 1945	12	59	16,446	5,540	5.71
Rhine	7-31 Mar 1945	17	92	15,214	7,185	5.13
Moselle	5-18 Sep 1944	7	63	14,679	3,585	3.88
Total		43	236	15,490	18,339	5.02

¹ Inclusive dates within which one or more divisions in the sample contributed combat days to the indicated operation.

² WIA per 1,000 men per day.

TABLE 7
WOUNDED IN ACTION DURING DEFENSIVE (ENEMY COUNTERATTACK) OPERATIONS,
U. S. ARMY AND MARINE CORPS DIVISIONS, WORLD WAR II

Operation	Calendar period ¹	Number of divisions	Division days	Mean division strength	Wounded	
					Number	Rate ²
Okinawa	4- 5 May 1945	2	4	11,537	692	15.00
Mortain	7-12 Aug 1944	6	29	15,539	3,033	6.73
Anzio						
1st attack	3-12 Feb 1944	2	20	18,327	580	1.58
2nd attack	16-18 Feb 1944	2	6	19,640	545	4.62
3rd attack	20 Feb-4 Mar 1944	2	28	19,340	1,468	2.71
Bougainville	8-24 Mar 1944	2	33	13,030	1,627	3.78
Ardennes						
1st phase	16 Dec 1944-2 Jan 1945	27	334	13,971	17,240	3.69
2nd phase	3-27 Jan 1945	20	372	14,654	19,864	3.64
Total		63	826	14,613	45,049	3.73

¹ Inclusive dates within which one or more divisions in the sample contributed combat days to the indicated operation.

² WIA per 1,000 men per day.

alone produced a WIA rate of about 13 per thousand average strength per day. The Rhine crossing yielded an average rate of 5.13 per 1,000 men per day, a rate that might have been much higher were it not for the capture and exploitation of the Ludendorf bridge at Remagen.

DEFENSIVE OPERATIONS AGAINST STRONG ENEMY COUNTER-ATTACK

There are many more operations in this class than the five chosen for study here: Mortain, Ardennes, Anzio, Okinawa, and

Bougainville. However, many of the attacks are either not well documented or are of comparatively small size, and it is believed that those mentioned represent the major enemy counter-attacks of the war. The operations in this class had the lowest rates, on the average. The distribution in table 1 shows that in the great bulk of the division-periods the WIA rate was between 2.0 and 3.9 per 1,000 per day. The weighted and un-weighted averages differ by more than those of any other type of operation, but both lie below the parallel rates for the other types

TABLE 8
WOUNDED IN ACTION FOR SELECTED TYPES OF GROUND OPERATIONS, U. S. ARMY
AND MARINE CORPS DIVISIONS, WORLD WAR II

Type of operation	Number of operations	Number of divisions	Wounded	
			Number	Rate ¹
Beachhead operations	8	24	26,570	11.04
Offensive breakthrough operations	3	16	7,420	7.14
Reduction of ports and towns	9	23	25,139	5.88
Assault on fortified lines	7	47	46,910	5.10
River crossings	7	43	18,339	5.02
Defensive (enemy counterattack)	8	63	45,049	3.73
Total	42	216	169,427	5.19

¹ WIA per 1,000 men per day.

of operation. It should be borne in mind that in all these different types of ground combat, wounded were sustained at a level well above the average of the war, and that the relative position among the types considered here is not the same as their relative position over the entire range of combat intensity in World War II.

Table 7 gives the details of each operation included in the set of defensive operations. The rates vary widely, the lowest being 1.58 during the first attack on the Anzio beach-head and the highest 15.0 at the time of the brief Japanese attack on Okinawa. No other counter-attack produced rates of this magnitude during World War II. The Ardennes breakthrough, considered here in its entirety, and involving combat units of three U. S. Armies (First, Third, and Ninth) yielded average rates at or below the overall average for the entire class of operations studied here. It should be pointed out that the WIA rates for individual divisions engaged in the Ardennes defensive ranged from a low of 0.98 to a high of 11.20. Even these rates are understated by the numbers who may also have been wounded, but were at the time

listed as either missing in action or captured when complete units were overrun by the enemy.

SUMMARY

Despite the great variation found among the wounded rates for individual operations, some slight measure of uniformity is introduced by the six classifications employed here. Table 8 provides a summary of the average wounded rates for each of the six types of combat chosen for study. Behind each rate there remains a great deal of variation, of course, especially among the beach-head operations. It is evident that many factors must be considered, in addition to the average rate. However, it is believed that a sufficient cross section of experience has been included to provide the planner with a partial set of models for combat operations where casualty incidence might be expected to be high.

REFERENCE

- ¹ Beebe, Gilbert W., and DeBaakey, Michael E.: *Battle Casualties*, Springfield, Ill., Charles C Thomas, 1952.



A Break with Tradition*

By

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THE world we live in is changing almost daily. The past ten years have seen the development and employment of the tremendous energy of the nucleus; man traveling at speeds approaching 2,000 miles per hour and reaching out into space more than twenty miles. High speed aircraft have shortened the period of warning of war from a matter of weeks to a few short hours. Large bodies of troops with necessary equipment can be transported anywhere in the world within a matter of hours. Logistic methods have been streamlined and speeded up. Trained technical manpower has become the most critical resource of the nations of the earth. The traditional concepts of military operations have been discarded or modified to keep pace with tremendous technological advances. Is military medicine fulfilling its destiny or is it lagging behind, bound by tradition and by antiquated systems of management?

The physician and surgeon is loath, by training and nature to accept changes until the process has been tried and proven. This philosophy presupposes that infinite time is available. I submit to you that medicine and particularly military medicine must revise its thinking, must awake to the fact that the time-space factor is rapidly decreasing, that it must broaden its horizons and be prepared to lead the way in reconciling the discrepancy between the changed requirements for medical services and our traditional cumbersome methodology of operation.

The profession of military medicine may be likened to a polygonal object, each facet

The opinions expressed herein are solely those of the author and in no way reflect the official views of the Department of Defense or the United States Air Force.

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of which requires careful reexamination and analysis in the light of modern trends. I present to you an analysis and approach to improving one aspect of our military medical service. The area may be identified as "Management of Professional Activities in the Military Hospitals."

It is not necessary to dwell on the details of the usual method of operation of Professional Services since military hospitals of both our countries utilize essentially the same systems.

There are certain disadvantages and violations of the principles of good management built into our present organization and methods:

1. It is wasteful of our most critical resource i.e.; physician time. The assignment of physicians to a single ward as a ward officer or assistant produces periods of inactivity due to variable patient loads. In addition part of his time is taken up in pure ward administration and thus the number of patients cared for is decreased.

2. It does not provide for well rounded medical practice. For example, the medical officer assigned to outpatient service has little or no inpatient rights nor responsibilities and usually must turn over an interesting case to one of the ward officers who may or may not be better qualified. This is most disturbing to the physician who is interested in his work.

3. It usually results in the outpatient service being staffed by the most junior and inexperienced physicians, when the most qualified should actively participate. Our mission is to keep people out of the hospital and preventive clinical medicine is best practiced by the qualified.

4. It often results in duplication of effort. On too many occasions the patient arrives on the ward, but the outpatient record does not, so the ward officer repeats diagnostic studies. This is costly in money, time of adjunct de-

partments and in terms of effectiveness of the patient. Patient days are needlessly increased.

5. It does not provide the framework for good Doctor-Patient relationship. A patient may see two or three different physicians on successive visits to the Outpatient Service, be referred to a specialty clinic where another doctor takes over and finally admitted to a ward where still another doctor is in attendance. By this time there is no personal relationship at all. This is one of the greatest faults of our system and the one that produces the most complaints from patients. That intangible factor of confidence in *MY DOCTOR* is too often lacking.

6. It does not provide for good continuity of treatment and thus patient care suffers. The patient who sees one doctor in outpatient, who is cared for by another in the hospital and who sees another for follow-up is not receiving the quality of treatment possible when one physician manages the patient throughout the entire illness.

7. It does not provide for integration of the work force at the operating level. Usually the Ward Officer reports to his Chief of Section or Service; theoretically the charge nurse reports to the Ward Officer but actually she reports to the Chief Nurse; the corpsmen work under the nurse, but are controlled by the Medical Detachment or Squadron Commander. The loyalties, supervisory direction, assignments to duty hours, passes, leaves, discipline, etc., are being plucked at from all directions. Not infrequently we will find a ward with a weak nurse, a poor corpsman, and a worse aide on duty at the same time. This can be dangerous and can be corrected only by placing total authority as well as responsibility for day to day operation on individuals rather than spreading out over a group.

There are other faults with the system with which we are all familiar, but I believe that the ones listed are the most important.

It is readily admitted that our traditional methodology has certain good points, the chief among which is that duty as a ward officer leading to Chief of Section through

Chief of Service to Hospital Commander forms a logical progression through the chain to the Command position. I am firmly convinced however, that Medical Officers by virtue of education, background and natural inclinations are quite capable of assimilating basic Ward Administration without performing the mechanics thereof on a daily basis for a number of years. I am also convinced that many Medical Officers will never be suitable to become Commanders regardless of how long they serve in subordinate positions. We should then concentrate our training efforts in this field upon those who show a desire and aptitude towards Management and Command. Conversely we should strive to increase the technical stature of those who are most suited for pure professional assignments.

After the conclusion of overt hostilities of World War II several conditions existed which made it apparent that a new approach was required. These conditions were; the mass exodus of militarily oriented medical officers from the service and the forced influx of those from the civilian milieu, having little or no familiarity with military systematization; the overall shortage of medical officers; the return of dependent and other civilian patients to the military hospital's sphere of responsibility, in ever increasing numbers; the demand by patients for more personal and more highly refined medical handling which approached that of private services in a civilian hospital; and the honest desire of the military medical services to provide the best possible care for our people.

In 1951, I was presented with the opportunity to put into effect some of the ideas that had been generating for a long time. A plan was evolved which slowly phased the conversion from traditional methods to the experimental one. The plan was based upon four concepts:

1. Relief of as many physicians as possible from duties not directly associated with care of the patient by reorganization of Professional Services and establishment of new relationships between physicians and other functions.

2. Reorganization of the Nursing Service with a realignment of authorities, responsibilities and relationships both internal and with other supporting departments within the hospital.

3. Education of the entire hospital staff and our clientele as to the change in functions.

4. Establishment of an appointment system providing for more intimate patient-doctor relationship.

It must be pointed out at this time that the first three concepts must be brought into play simultaneously and that the fourth may be introduced at the same time although not necessary to the initiation of the plan.

A review of the organization proposed is necessary for an understanding of the details of the method of operation. A brief look at the most common basic organizational structure of the military hospital (Chart 1) will refresh your memory and allow immediate comparisons to be drawn. Primary interest is centered on the Professional Services Organization, and a striking difference between the traditional and proposed structures (Chart 2) is evident. First those functions which are commonly considered to be adjunctive in nature and not a primary source

of patients such as x-ray and laboratory are shown as individual departments. The Physical Medicine and Aviation Medical Services have highly specialized missions and techniques, thus do not lend themselves readily to subordination or grouping with other clinical services. The great departure from tradition is encountered in the functions of Clinical Staff Division and Nursing Services Division.

The Clinical Staff Division is composed only of physicians and allied scientists, such as Optometrists. It corresponds to the attending staff of any civilian hospital with which you are familiar. It functions on very much the same order as the attending staff. The Division is composed of three groups and the word is used with a purpose because they do not represent facilities, but only a functional segregation of technical skills. A fourth group may be added where there is an Interne-Resident Staff. The function of the Chief of Division, who is normally the senior assigned medical officer, is to integrate the activities of the three groups. The functions and relationships of each group are shown on Chart 3.

The General Practice Group is composed of assigned or contract medical officers who

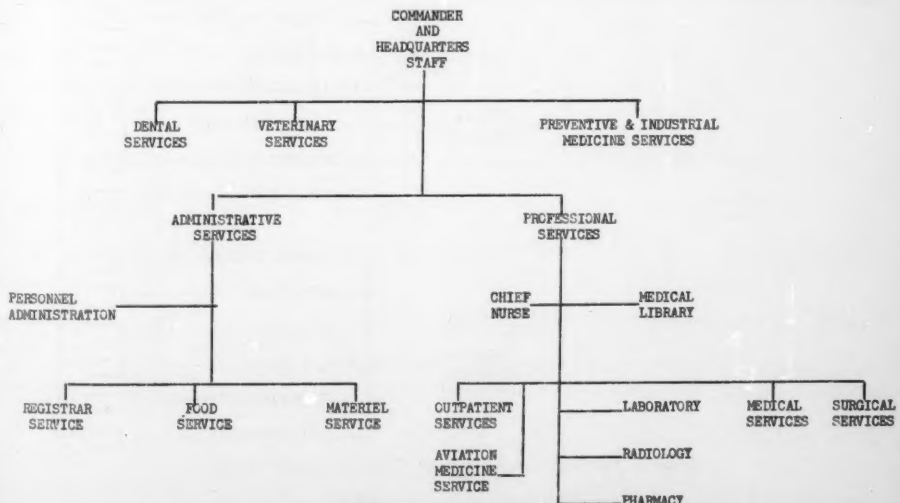


CHART 1. BASIC HOSPITAL ORGANIZATION

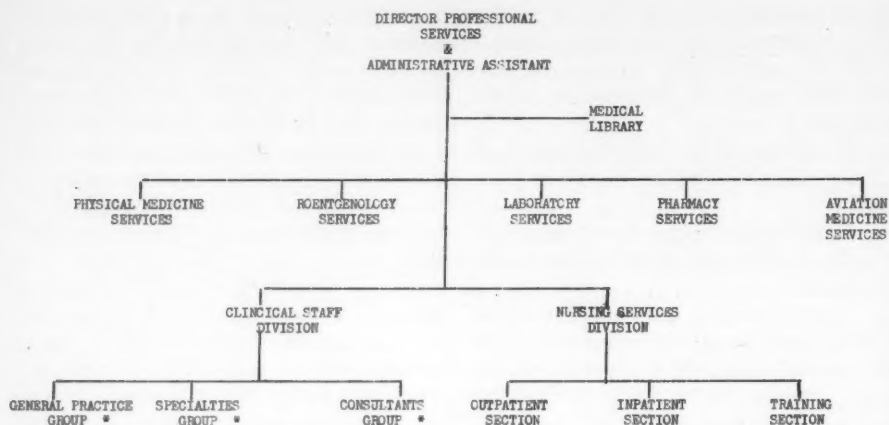


CHART 2. PROPOSED ORGANIZATION PROFESSIONAL SERVICES

* All are Physicians or Allied Scientists.

have elected general medical practice as their career field or who have not completed sufficient specialty training to be qualified in one of the limited fields. Each individual practices general medicine and surgery to the extent

allowed by his capabilities and experience and as determined jointly by the Chief of the Clinical Staff Division and Chief of the Specialty Service concerned. The Group corresponds to the general practitioner in civil

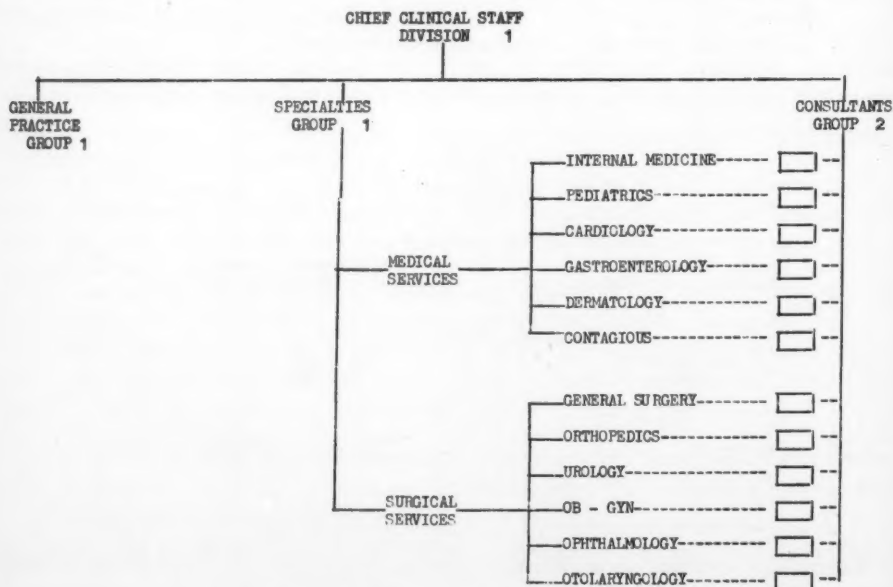


CHART 3. PROPOSED ORGANIZATION CLINICAL STAFF DIVISION

¹ Senior Medical Officer in each case will function as Chief.

² Chief of Group may be elected or appointed.

life. He is supported by and may call for assistance from any of the appropriate specialists available. The members of this Group will have both Inpatient and Outpatient responsibilities. He will however, in the care of inpatients, conform to the standards established by the Chief of the Specialty Service concerned.

The Specialties Group is composed of individuals who by training or demonstrated ability may be regarded as qualified in a specialty field. In our service the individual, who has completed all required formal training for eligibility to stand for an American Specialty Board, or who is certified by one of the Boards, or who by virtue of long experience in a particular field is considered by the Chief of Division and Director of Professional Services to be qualified, may be assigned to this Group as a member of the appropriate service. The universal break down of the Group into the usual Medical and Surgical Services with the specialties available is followed. The members of this Group are responsible for conducting specialty clinics, for the care of inpatients on their respective services and for acting as consultants and advisors to the General Practice Group. The Chief of each specialty service is responsible for establishing and maintaining the standards of care for patients on

his particular specialty service, acting as consultant to other specialties, for advising and assisting the Nursing Service as to proper nursing procedures as applicable to his particular specialty and for such administration as may be necessary for the proper functioning of his Service or Services.

The Consultant Group is composed normally of Medical Officers and/or Civilians who are highly qualified in a specialty and who are not members of the assigned staff. These individuals are primarily for the purpose of training or assistance to the appropriate specialty service and will bear a direct relationship thereto. A Chief of this Group may be elected or appointed by the Hospital Commander.

The next radical departure from tradition is to be found in the Nursing Services Division (Chart 4). You will notice by reference to Chart 1 and Chart 2 that the Chief Nurse has been removed from a purely staff position. She has never functioned thus in my experience. She is now placed on the operating level in the chain of control and is responsible directly to the Director of Professional Services. This has tremendously elevated the importance of the Chief Nurse. It has correspondingly increased her authority and responsibility. She has become an executive in a true sense and a full fledged member

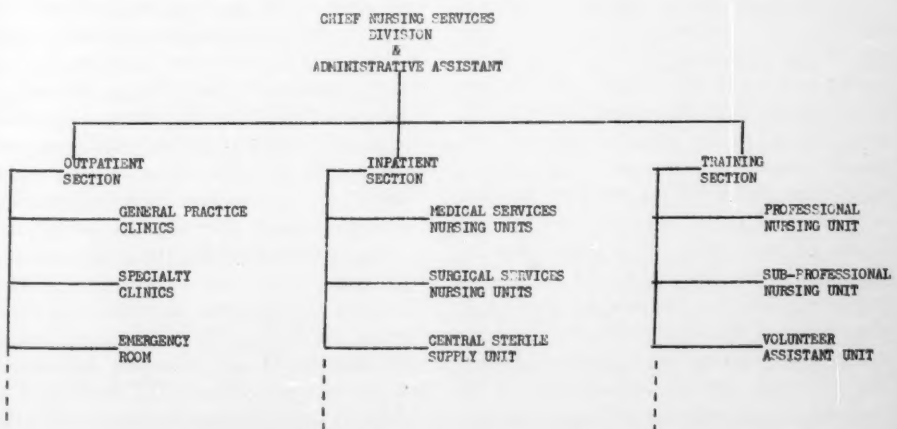


CHART 4. PROPOSED ORGANIZATION NURSING SERVICES DIVISION

of the management team. She becomes responsible for the day-to-day operation of those facilities in the hospital which are devoted to the clinical care of patients. All personnel who perform nursing or related functions are placed under her jurisdiction and thus she is in charge of the vast majority of people working in Professional Services. In any, except the smallest of hospitals, she must have an administrative assistant, usually a senior non-commissioned officer to handle the details of personnel placement, passes, leaves and the equipping and supply of the various units in the Division. This Division is organized into three Sections, Outpatient, Inpatient and Training.

The Outpatient Section operates the nursing, attendant and technical aspects of all Clinics and treatment activities serving outpatients except Physical Medicine and Aviation Medicine. The Section is normally composed of the General Practice Clinics, the Specialty Clinics and the Emergency Room. The Senior Nurse or non-commissioned officer is in complete charge of the equipment, supplies and personnel except for clerks and receptionists. These latter are considered part of Administrative Services and support the operation. This Section functions in very much the same manner as does the office suite of a group of physicians in civil practice.

The Inpatient Section consists of the various Nursing Units and Central Sterile Supply. We no longer use the term WARD, but prefer to refer to this facility and function as a Nursing Unit, the reason being that the term, Ward, in the minds of most of our people connotes charity and brings to their mind's eye the vision of the City Hospital with crowded, poorly equipped, understaffed wards of days gone by. I admit that the change in terminology is mostly a matter of public relations, but I believe it is more truly descriptive of the activity. There may be any number of nursing units, depending upon the size and physical arrangement of the hospital coupled with the services being provided. These specialties which have similar nursing, supply and equipment requirements

are often grouped into one Nursing Unit. For example, in one hospital of the cantonment type, three adjacent 20 bed buildings in which General Surgery, Orthopedics and Urology cases were being placed was organized into a single Nursing Unit. A Senior responsible Nurse was placed in charge of the Unit and all personnel of the three facilities placed under her direct control. This allows for considerable flexibility in work assignments as well as having other advantages. The operating suite and recovery unit are included in the Surgical Services Nursing Units.

Before going further, a discussion of the Nursing Unit is in order (Chart 5). This unit, regardless of size function, number of people assigned or configuration of the physical plant occupied, is the building block upon which the entire clinical services, of the hospital, are constructed. Doctors give orders and perform certain procedures, but the bulk of medical care is rendered by the Nursing Service. The Nursing Unit is a distinct separate working entity composed of the housing, equipment, supplies and people necessary for the accomplishment of its mission. All these resources are under the direct control of the Charge Nurse, to use as becomes necessary for patient care. The Nursing Unit is analogous to a Company, and even though the Charge Nurse is not a Commander in the legal sense, she is one functionally. The Unit has five readily identifiable components and the Charge Nurse with her "Unit Master" or N.C.O. Assistant. The Charge Nurse is wholly responsible for the proper operation of the Unit and must be accorded commensurate authority. The Unit Master is a "must," as his function is to relieve the Nurse of as much administrative work, such as supply, duty hour assignments, work assignments, reports and records, as possible. The five components are the Graduate Nurses, the Medical Corpsmen, the Civilian paid attendants, the Volunteer Aides and last, but most important, THE PATIENTS.

The Training Section requires very little comment. It appears to me that the best place to train Nursing Service personnel is

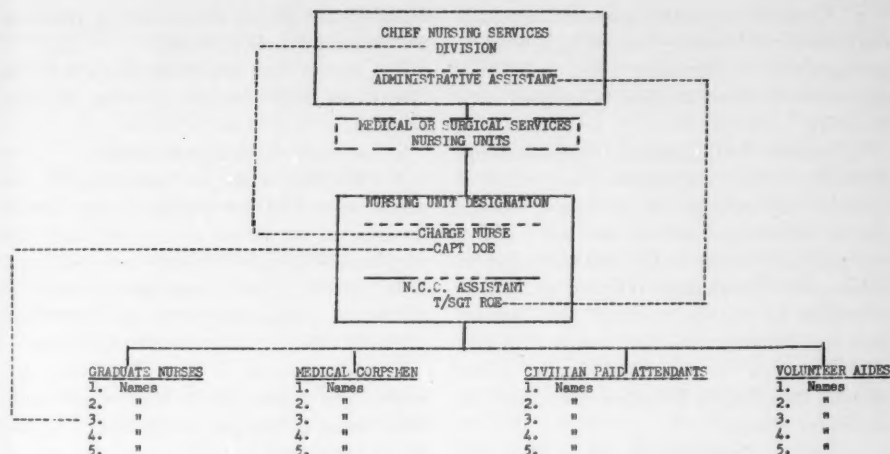


CHART 5. FUNCTIONAL CHART NURSING UNIT

on the Nursing Service. This Section may well be omitted, but the highly skilled people of the Nursing Services will still be called upon to do the work of improving staff capabilities, so why not let them handle the entire program.

The principles of operation under the organization outlined are fairly evident, but a general discussion of the methodology is desirable. A number of minor problem areas will arise during the process of conversion; therefore it is wise to "make haste slowly." Most of the problems can be predicted, but the solutions will vary with local conditions. The conversion must be done in phases allowing each phase time to shakedown before instituting another. Almost every department in the hospital will be affected and to change the system abruptly would result in chaos.

Let me outline the steps in a plan that has been successful in effecting the change.

1. Call together the key members of the hospital staff, both administrative and professional to include several of the more mature nurses. Outline for them the eventual goal in organization and operations. Hold a discussion to be certain that full understanding is reached.

2. Select a ward or wards which are in close proximity and have similar basic nursing procedures and closely allied specialties

present. Select carefully the Charge Nurse and Unit Master. Call all the people possible who normally work on the selected wards together and brief them on the organization and methodology to be used. In addition tell each of the key individuals his responsibility, his authority, whom he reports to and generally what is expected of him. Tell them the date of initiation of the conversion.

3. Notify the key hospital staff of the date and wards to be converted.

4. On the date selected take the following action:

- a. Designate and activate the Nursing Unit.

- b. Appoint the Charge Nurse and Unit Master.

- c. Reassign all nursing type personnel to the Nursing Unit from whatever services they belong.

- d. Relieve the Medical Officers assigned as Ward Officers and Assistants, but leave them assigned to the appropriate service.

- e. Arrange that these officers be given outpatient office hours for as long a period, as often and on as many days as practical, depending upon office space and other duties.

- f. Arrange for all other specialists, except a Chief of Major Services, whose specialty was involved in the conversion, to have regular office hours on the same basis as *e* above.

g. Assign all patients present on the wards converted to a Nursing Unit to the appropriate specialist or equitably when more than one medical officer involved is assigned to a specialty.

h. Instruct the Outpatient Department and Specialty Clinic receptionists that, effective at once, any patient seen on initial visit by one of the medical officers in *e* and *f* above will always be appointed to that physician on subsequent visits unless referred to another physician or service by him. Also instruct that appointments made in the specialties involved will be to individual doctors for a specific time during his office hours and not to a clinic as such.

i. Instruct physicians in *e* and *f* above and the Nursing Unit, that any patient admitted to the unit by direction of, or who has been cared for as an outpatient by one of them will be the personal patient of the physician concerned. When a patient is admitted to the Nursing Unit from a source other than the office of one of the physicians concerned, the appropriate specialist will be notified and will assume responsibility for the patient. Where there is more than one medical officer in a particular specialty, the Chief of Service will designate the method of equitable assignment of such patients.

j. Inform the Medical Officers assigned to the general outpatient department that they may, subject to approval in each case by the Chief of Specialty Service concerned, admit patients to the Nursing Unit as personal patients. The diagnosis and treatment of each such case will be conducted under the supervision of the Chief of Service concerned.

5. After sufficient time has elapsed to allow stabilization of the first conversion, successively convert the Inpatient activities of the Major Services into Nursing Units. Then convert any remaining Inpatient functions until the Inpatient Section of the Nursing Services Division is fully formed and functioning as such. This is the key.

6. Select out those men qualified in the various specialties and if necessary a sufficient number of partially qualified to form the Specialists Group. The remainder of

the Medical Officers should then be placed in the General Practice Group.

7. Convert the Outpatient Services to the Outpatient Section of the Nursing Services Division.

8. Form the Consultants Group.

9. Publicize what is happening to the people served so that they have some understanding of the system as it is working. This may be done as the increments are converted. This factor is very important, almost as much so as acquainting every one in the hospital with the organization and operation.

If such a workable plan is devised, followed, and controlled it will result in the basic concepts being accomplished. They are, if you remember:

1. A large proportion of the medical officers are engaged almost full time in care of the patient and their relationships with each other and various departments will more closely approach that of civil and private practice.

2. The Nursing Service will have been completely reorganized and will have a more important place in the team. Specific authorities and responsibilities will be clearly enunciated for them.

3. An appointment system has been established which allows patients some choice of doctors and an ensuing more intimate relationship.

4. The staff and the clients are better informed concerning the organization, operation and capabilities of the hospital.

The presentation leaves a great many questions unanswered, such as: What happens to Military Sick Call?, How is the Emergency Room covered by a Doctor?, What happens to the patient who comes without an appointment?, What happens when a doctor takes leave or is transferred?, and others. I can only assure you that they have been answered in many ways in different locations.

Why bother to change the system? What does the hospital gain? In my experience the following results have been produced:

1. The number of patients seen and cared for has increased. In one instance it rose from 10,000 Outpatient visits per month to

from 14,000-15,000 with an actual decrease in staff at the same time.

2. The patient stay in hospital is decreased, as the doctor is able to follow his patients in his office.

3. The medical staff has been happier and pleased with the system, almost without exception.

4. Patients have uniformly been pleased with this approach as evidenced by a remarkable decrease in complaints. This is primarily because the normal Doctor-Patient relationship is fostered.

5. The Nursing Service has usually been pleased and becomes more effective because they have a definite alignment of responsibilities and authority.

6. Better hospital management has resulted because functions and people who perform them have been put together. People know who they are working for and a sense of belonging to a unit is developed.

7. Patient care is generally improved because of better staff attitude, more personal interest in the patient, standardization of nursing procedures and continuity of treatment.

8. There has been a decrease in the loss and destruction of government property, primarily because the people who use it constantly and live with it all the time are responsible for it.

In conclusion, I have outlined a break with tradition by offering to you an organization and method of operation of the Professional Services of the Military Hospital which is radically different from that utilized for many years. I have presented very briefly one method of putting the organization and procedure into effect. I do not say that the ideas outlined are the only or even the best solution to the problems confronting us. I do not say that the plan is applicable in all locations and situations nor do I conclude that it must be adopted in its entirety to obtain beneficial results from application of the principles involved. You must be informed that it does not represent the officially directed organization and procedure for operations within the hospitals of the United States Air Force. I can report that the plan has been tried in medical installations under my control and has produced the results indicated. I can also report that use of certain of the principles in other Air Force Hospitals has improved service and management.

This presentation has been made, not to persuade you to institute the identical system in your own hospitals and services, but to arouse your curiosity and stimulate examination of the management systems of the Military Medical Services with the purpose of obtaining greater effectiveness and thus "Conserving Fighting Strength."



Viral Epidemic Hemorrhagic Fever (Far Eastern Type)

Further Notes on Its Appearance in Europe and Asia

By

CLAUDIUS F. MAYER, M.D.

IN THE late summer of 1951, at the epidemic outbreak of a febrile hemorrhagic disease among the troops of the United Nations' Army in Korea, the disease was first thought to be an obscure acute infectious ailment either endemic or just recently introduced in Korea. Some people were even alarmed by the idea that the cause of the mysterious disease might have been deliberately planted by the opponent in the combat zone of the Far-Eastern Theater of Operations.

First-hand information obtained from former military doctors, who had taken part in the Japanese campaign against Manchuria during World War II, indicated that the disease was not new and not limited to Korea since the occupying forces of the Japanese Army in Manchuria had been earlier attacked by a similar acute febrile disease which was also characterized, exactly as the Korean epidemic, by high fever, various types of bleeding in the skin and the internal organs, and some kind of kidney trouble. The scanty Japanese military medical literature called it "epidemic hemorrhagic fever," which term has been also later used by writers in western languages.

When I first learned of the Manchurian epidemic in September 1951, the Japanese description of the strange pathology of the infection, especially on the changes in the kidneys, left a deep impression on me.¹ Study of the map of the northern sector of Asia made me suspect that the incidence of the strange disease could hardly be limited to a couple of countries of the Far East on one side of a big river, the Amur, alone, when in other neighboring countries, on the other side of the river, Nature had provided almost similar environment and living conditions. This thought urged an intensive study of the

Russian literature of medicine where I found a confirmation of my hypothesis.

As a result, in December 1951 I was able to show that the incidence of epidemic hemorrhagic fever was not limited to Korea and Manchuria,² but that it had been also well-known and intensively studied for a number of years in Far Eastern Siberia, although described by the Russians under a different mask, i.e., as "epidemic hemorrhagic nephroso-nephritis" in the Soviet medical literature. My further establishing of the identity of the described clinical, and pathological appearance of the Japanese hemorrhagic fever with those of the Russian disease, on one hand, dispelled even the slightest suspicion of a Russian-launched bacterial warfare against our troops in Korea, while on the other hand it opened a hitherto hidden and unsuspected stock of sound medical observations and views which continued to serve as basis for the rapid growth of American and Western research on the etiology, epidemiology, clinical course, pathology and treatment of epidemic hemorrhagic fever.

The subsequent western literature on epidemic hemorrhagic fever (EHF) grew to a very large volume, and it now includes a number of interesting clinical epidemiological and pathological studies covering many aspects of the infection.¹ The etiological investigations remained unsuccessful, however, and not much definite is known of the assumed viral agent of the disease beyond the few meager facts established long ago by the Russian virological expeditions sent to the Far East.

From the primary observations of this epidemic infection, and from all the investigations of the epidemiology and etiology of its Korean outbreak, the assumption was

somehow slowly gathering that EHF is still limited, if not to a country, then at least to the cold Far Northeast of Asia.

Meanwhile, as these recent studies of the American literature were read by military surgeons and pathologists elsewhere,⁶ and thus they became alert and aware of the existence of this particular disease, especially under certain conditions of military life, observations of similar small epidemics were also gathered in countries remote from the Far East of Asia, as e.g., in Hungary and in Czechoslovakia.

Two years ago, in the December 1955 issue of *MILITARY MEDICINE*,³ I was able to collect many of these genuine European incidences of EHF in a review article which, partly in retrospect, also included several not clearly defined cases of some epidemic renal ailment with hemorrhages and fever, described earlier by Scandinavian observers and more recently in Bulgaria and Yugoslavia and near the Ural in the European part of Russia. On the basis of its original description, the Ural epidemic seemed to me very much like an outbreak of the Far-Eastern type of epidemic nephroso-nephritis. My assumption was recently (1957) definitely confirmed by Ugrjumov,⁴ who ventured further, however, by taking the Scandinavian cases of epidemic nephropathy and the Yugoslavian cases of viral glomerulonephritis for one and the same disease of EHF, doing so by considering rather the similarity of the clinical manifestations and paying less attention to the differences in the clinical symptoms.

This seems to open a new approach to the problem of the complex of EHF-s, an approach which is in close adherence to, and is a further development of the Russian hypothesis of "Nature's centers of human diseases" first suggested in 1955 by E. N. Pavlovsky.⁵ Apparently, the etiological research of EHF reached an impasse all over the world, and we do not seem to be able to get closer to the viral cause of the disease today than we were two years ago when I summed up the status of global virological research in EHF as follows: "... unknown

virus, unknown vector and host, unknown portal of entry, unknown route of spread, and unknown immune biology."³ We are still suspecting various rodents in the woods whose harbored parasites are supposed to be the real live culture media, the living thermostats for the growth of the ultra-microscopic pathogenic agent of the disease.

The turn of Russian clinicians and military surgeons to the hypothesis of "Nature's foci of infection" of EHF is a useful escape which enables medical officers and epidemiologists of troops of soldiers or of groups of laborers to take adequate precautionary measures against the suspected hosts and carriers of the unknown agent of the disease when the troops are going to invade a virgin area of nature. There is much evidence, for instance, that at the detected sites of EHF the incidence of infection can be greatly reduced by maintaining a wide zone of security around camps or villages, a zone cleared of woods and underbrush and provided with a dense net of traps against the prevailing rodents.

Since such measures proved to be equally effective against all rodent-borne hemorrhagic diseases, no wonder that the latest Russian medical opinion assumes the *unity of all infectious hemorrhagic fevers*.⁴ It is believed that the same disease may have slight variations, peculiarities in its clinical forms, in its pathological anatomy at different parts of the world. This variation is perhaps due to a phenomenological change of the basically identical virus of the infection at the different "Nature's foci," a phenomenological change caused perhaps by a difference in the fauna of rodent hosts and rodentophil parasites as vectors. The geographical variance in the clinical and pathological appearance of the disease unit may come about partly not so much by the variability of the agent's nature with land and climate but by a long labile chain of factors present in the environment and affecting the biological reactions of all chained recipients and transmitters of the viral agent.

With this general thought in mind, it is

easy for someone to arrive at the conclusion, as Ugrjumov did, that all outbreaks of EHF, previously observed anywhere, are essentially the same "infection originating at Nature's focus" ("*prirodno-ochagovaja infekcija*"), and that the different degrees of renal lesion and renal insufficiency (degrees of albuminuria and residual nitrogen in the blood, hyposthenuria)—which for all observers seem to be pathognomonic symptoms—should be explained by the variability of clinical manifestations in accordance with geographical zones rather than by supposed fundamental differences in the etiology of the infection.

Indeed, if we compare the clinical signs of renal lesion of the known outbreaks of EHF and other related affections at the "Nature's foci" observed in Asia and Europe, there is an evidently striking similarity, except for the outbreak of the disputable infection in Yugoslavia. The following table was compiled by Ugrjumov:⁴

Geographical Zone of Hemorrhagic Fever	Maximum of albuminuria (in pro mille)	Maximum of res. nitrogen (in mg%)	Lowest specific gravity of urine
Far East (Siberia)	85	320.6	1001-1002
Pre-Ural and Ural Distr.	33	158.6	1000-1003
Korea (Amer. Army)	4 plus	242.0	1002
Czechoslovakia	4 plus	380.0	low
Hungary	4 plus	114.0	1001-1005
Pre-Carpathian Distr.	93.7	298.0	low
Norway & Sweden	16	360.0	1001
Finland	18	—	1001
Yugoslavia	—	405.0	1010

With the contemplation of such a series of similar renal signs, it is not surprising that, at a recent meeting of the Moskva Therapeutic Association, G. P. Rudney and V. N. Vinogradov⁴ announced their opinion concerning the unity of all hemorrhagic fevers, and concluded that even the Crimean and the Omsk hemorrhagic fevers, which had been considered by pathologists and virologists as entirely different pathological entities, might be but geographical and clinical variants in the group of hemorrhagic fevers.

Since the December 1955 collection of European cases in the MILITARY MEDICINE,³

the European literature of the last two years recorded further evidences to show that EHF is prevalent over a much wider world than the northeastern corner of Asia where it was thought first to be at home.

1. EARLY MILITARY CASES NEAR THE ARCTIC CIRCLE

Group outbreaks of a febrile epidemic disease with purpuric rash and renal lesions had been described in the German Army advancing in 1942 in the tundras of Lapland and positioned in the forest-covered areas 50 Km north of the Arctic Circle (Stuhlfauth and Hortling, cit. by Ugrjumov in 1957).⁴ The outbreak is now considered a genuine epidemic of viral hemorrhagic fever. The morbidity of the German troops, deployed at this typical natural focus of EHF was quickly rising. At the time of the epidemic it was noted that the number of rodents strongly increased in the area. The number

of sick soldiers was especially large in the units taking up battle position in the front line. The percentage of morbidity in the units was less and less the farther away they were located from the main line of defense. It is mentioned that out of 100 German soldiers suffering from EHF in this region 74 belonged to the two infantry regiments which occupied front positions, 13 came from the artillery, 6 belonged to the engineer battalion, 4 were assigned to the reserve, and 3 were from the medical detachment. In this epidemic of EHF among the German troops at the Arctic Circle the probable vector of the

disease was the lemming, as it is supposed in Russian sources.

2. FURTHER CASES AND STUDIES OF EHF IN HUNGARY

Hungarian military authors reported four small epidemics of EHF observed in the summer of 1953 among the summer-camping troops.⁶ This original series included 58 cases. One of the important problems in the study of EHF is, of course, whether its renal lesions will cause permanent damage. From previous American studies (Giles, 1954)⁷ we know already that in a small number of patients such residual troubles may be expected as anemia, hyposthenuria, etc. A follow-up of 44 cases of the Hungarian series (A. Kincses, et al., 1956)⁸ showed that about a fourth of the patients who passed through the disease still had a slight failure of renal concentration power (maximum specific gravity not more than 1023), and about one half of the sick kept on complaining of some pains in the loins.

Two additional, new sporadic, fatal cases of EHF were also detected among the Hungarian civilian population (Borda, et al., 1956).⁹ The first one dates back to 24 August, 1953, the year and season of the previously described military epidemics of EHF. A 54-year old female physician died from the disease which was originally diagnosed as some gastrointestinal intoxication, but postmortem examinations revealed hemorrhages in her kidneys and in the pituitary gland, later identified as manifestations of true viral hemorrhagic disease. The lady doctor spent her days in her villa on the Danubian riverside in the country town of Szentendre, a place where some of the Army units were also camping among which the 1953 summer outbreak of EHF occurred. It was noted that the Duna River had high waters, which caused floods in some sectors of the riverside, populated then not only by people but also by many displaced mice. The doctor's exposure to carriers of the virus of EHF is quite obvious. The other sporadic Hungarian fatality from EHF concerned a 32-year old woman who died on 24 January

1955 in the village of Gyál. She had been treated for pancreatitis acuta and for sepsis, while the doctor's original diagnosis was hepatitis and hemorrhagic pancreatitis. After her death, histological sections of her kidney showed the typical pathological renal changes of EHF. At the time of her illness, many mice were noticed in the village. The woman's occupation required close contact with hay and straw.

3. CASES OF EHF IN CZECHOSLOVAKIA

Another natural focus of EHF had been established in Czechoslovakia. In December, 1955, we called attention to reports of Czechoslovakian doctors (Plank, et al.) on two authentic cases of Far-Eastern type of EHF.³ These cases were particularly remarkable for the rather strong hematuria which developed in their course. The tentative clinical guess, based upon this highly emphasized renal symptom, was for a malignant growth of the kidney. Only after death was the true nature of renal insufficiency further studied and recognized as a result of EHF. An additional sporadic case of epidemic hemorrhagic fever was described in Czechoslovakia last year (V. Poljak, 1956).¹⁰

4. CASES OF EHF IN BULGARIA

Sixteen various cases from Bulgaria have been alluded to in December, 1955.³ There was some doubt then whether they were true cases of EHF. Neither did the Russian authors refer to these cases in their various discussions on EHF.

In the course of 1956, however, two authentic fatal cases of epidemic nephros-nephritis have been reported from the village of Chiflik-Troiansko, which makes it now certain that Bulgaria is also one of the "Nature foci" of viral hemorrhagic fever. The cases have been carefully studied and described clinically, anatomically, and epidemiologically in four articles by several Bulgarian doctors (I. Dosev, R. Kirov, K. Solov, B. Matinchev, 1956).¹¹⁻¹⁴

With the access of Bulgaria to the list of geographical areas of EHF, it may be supposed that on the Balkan Peninsula—

having similar map, with approximately equal orographic, hydrographic, biocological, and climatological features in favor of the biocenosis of rodents and mites—the rest of the countries must also have their "Nature foci" of this strange disease in their impenetrable, virgin forests. In other words, it seems that, from the Arctic Circle down almost to the Mediterranean slopes, epidemic hemorrhagic fever is at home among the pine trees and in the spruce forests, in the tundras of the North as much as in the oak forests of the South, along the steppes and river banks, etc., wherever certain types of rodents find their habitat.

5. RECENT RUSSIAN CASES OF EHF IN THE ARCTIC REGION

A team of Russian physicians and zoologists who have been working above the Arctic Circle in the Extreme North of Russia in 1953-1955, succeeded in recognizing several sporadic cases of the Far Eastern type of viral EHF in the course of 1953 and early 1954 (L. N. Troparev, et al., 1957).¹⁵ In their report, which was published this year, they are quite happy to have positive evidence for a focus of the disease so far north in Nature. They observed but six cases altogether, scattered over an area of about 100 Km width, at five posts which were located at the southerly portion of a forestal zone in the district of their studies. The clinical course of the disease in all six patients was similar to the course of hemorrhagic nephroso-nephritis as known from the description of previous observers (G. A. Azizbekjan, 1953).¹⁶ Since one of the patients died, opportunity opened for pathological anatomical studies which, at the Kirov Military Medical Academy (the Russian "AFIP"), showed the typical histological changes of EHF. It is a pity, though, that the team had no facilities for bacteriological examinations of the patients and of the available murine rodents and their ectoparasites at the site of EHF in the Extreme North of Russia.

On the other hand, the zoologist member of the team (T. V. Koshkina) had been

studying the rodents of this wooded area for almost nine years since 1947, and trapped over 7,000 beasts in various sections of the forest area and in the adjacent tundra. In the two critical years of the above mentioned sporadic cases of EHF the zoologist also began to collect the ectoparasites of the rodents, having picked 590 fleas and 1900 ticks from the rodents. It was possible to identify 13 species of rodents, 11 species of fleas and 14 species of gamasid ticks.¹⁵ The most frequent rodents were:—1) the European red vole (*Clethrionomys glareolus*), predominant in the southern part of the jungle of the North; 2) the gray vole (*C. rufocanus*) found in the forest and tundra; 3) the red vole (*C. rutilus*); 4) the economy vole (*Microtus oeconomus*); 5) the lemming (*Lemmus lemmus*); 6) the water rat (*Arvicola terrestris*); also 7) the *Neomys fodiens* and 8) the *Sorex araneus*, together with the common house-mouse, and the Norwegian rat. Among the parasites of the rodents the most common were the fleas *Ceratophyllus penicilliger*, and *C. uncinatus*, and the tick *Euhæmogrammus nidi*.

This zoological study is apt to show that the species of rodents and their ectoparasites vary greatly in the North. It was noted that in 1953 and 1954 there was a great abundance in voles and lemmings, especially in the Fall when all cases of EHF occurred. Which one of the rodents and parasites was the vector and source of infection is, of course, hard to tell. But the affected men had ample opportunity in the Arctic region to come in contact with rodents either in their work at the forest or at their primitive homes.

6. FURTHER DATA ON EHF AT THE FOOTHILLS OF THE URAL

Previously (1955) we alluded³ to an epidemic of EHF which was prevalent among the lumbermen at the Foothills of the Ural Mountains (Predural) in 1953 (Solomin, Ugrjumov, et al., 1953).¹⁷ This natural focus of the disease was actually detected in the autumn of 1952 in the village of Pÿzhman, in the southern part of the Udmurt Autonomous Soviet Socialist Republic (ASSR)

(capitol: Izhevsk), where it had been ever since studied in every respect.¹⁸ Thus, for instance, scientific expeditions were sent to this Republic in the late summer and early autumn, the common season of epidemics of EHF. For the clarification of EHF, laboratory experiments were also carried out on various common laboratory animals (on guinea-pigs). The rodents of the area of epidemic were also repeatedly trapped to determine their possible relationship to the disease.

From the recently published reports (July 1957, Solomin)¹⁸ it becomes evident that at the Udmurt focus of EHF the prevalent species among the rodents is the red-haired European vole (*Clethrionomys glareolus*) which seems to be the special reservoir of the virus of EHF in Nature. (See also Ugrjumov, 1957).⁴ Indeed, so close is the relation of this rodent to EHF, that the Russian observers were able to predict in June, 1954, the coming of another set of sporadic cases of EHF in the fall of 1954, just from seeing a great increase of the European red vole among the beasts trapped in that early summer month. It was interesting to observe also an increase in the number of certain ectoparasitic species on the red voles, especially of the "redbody ticks." The 1954 appearance of EHF in Udmurt was rather limited to individual cases, partly for the excellent organization of the suggested 500-meter wide protective zones and other derodentization measures around the once affected villages. The reduction of cases might have been also the result of environmental and biocenotic changes.

7. ACCIDENTAL LABORATORY AND AEROGENOUS INFECTION WITH EHF

The 1954 expedition for the study of EHF at Udmurt was also significant for another interesting fact. As Lt. Col. Solomin reported (1957),¹⁸ he himself became accidentally infected with EHF, along with other people either engaged in experimental laboratory work or just passing through his laboratory. These cases of laboratory infections occurred between 14 November and 9 De-

cember 1954. The clinical aspect and course of these cases was very serious, excepting one case, and all showed predominance of the typical renal and urinary symptoms, vehement pains in the lumbar region, and positive Pasternak test.

The single patient in whom EHF took a somewhat atypical course was Col. Solomin himself. Only his urine showed the usual features of EHF. He also developed *pleuropneumonia* with infarction in the left lung. This finding, together with the fact that all experimental animals were kept free of ectoparasites in the laboratory, suggests the possibility of an *aerogenous infection*, an entry of the virus by inhalation through the respiratory tract, since there seems to be no other possible way of transmitting the disease in these cases of laboratory infection. A second interesting finding, almost misleading the investigators, was the fact that all EHF patients gave a positive serological reaction in a test for Q-fever agglutinins. When later on, however, the same blood sera were tested with Q-fever antigen in a complement deviation reaction in another laboratory (that of Prof. Zdrodovsky), all sera gave negative results. In other words, no serological relationship exists between EHF and Q-fever.¹⁸

Since 1952, Solomin and his coworkers have been trying different ways to provoke an experimental infection of EHF in laboratory animals. But in vain! In the animals (guinea-pigs) used at the start of the experiments no infection developed; neither was there any infection among the laboratory staff. But everything changed in the fall of 1954 when the investigators began to use healthy European red voles (*Clethrionomys glareolus*), in place of the guinea-pigs, for the experimental transmission of the disease.¹⁸ The voles were inoculated with the blood of sick people. Since these particular animals are the supposed and proved natural carriers of EHF virus, the pathogenic agent, upon inoculation into its natural carrier, greatly increased in virulence, and this more virile virus is responsible for the unexpected outbreak of the disease among the

laboratory workers. In the employed other species or genera of experimental animals which are not carriers of EHF virus in Mother Nature, the virulence of the virus dropped during the animal passages. Thus, the earlier experiments with such animals remained harmless to the investigators, too. Solomin therefore recommends that all experiments with EHF virus should be carried out on the European red vole. The work at the Udmurt laboratory seems to indicate the viral nature rather than a rickettsial origin of epidemic hemorrhagic fever.

8. CASES OF EHF OBSERVED BY THE RUSSIAN NAVY NEAR VLADIVOSTOK

A fresh report (June 1957) of members of the Russian Military Medical Service (M. N. Fedorov and V. P. Harlamov)¹⁹ indicates that during the last ten years newer foci of epidemic hemorrhagic fever were discovered in the Shkotov and Suchan Districts of the Eastern Shores of Siberia (the so-called Primorsk) as well as in the vicinity of the Navy port in Vladivostok. In the Shkotov District, outbreaks of the disease have been noted at such inhabited posts as Maiha, Razboinik Bay, Suhodol, Petrovka, Krym, Tinkan, Promyslovka, etc. Several of the patients were admitted to the medical facilities of the Russian Navy, but the only meager information they could give about their sickness was that before getting sick they had spent some time in or near the Siberian jungles ("taiga").

The Russian Navy Medical Service took the practical point of view of these infections with EHF, and decided to eradicate the natural foci of this zoonosis whose epidemiological chain at present is supposed to be Virus-Ectoparasite-Rodent-Ectoparasite-Man. Thus, eradication of the natural foci means first of all derodentization and disinsection. Such preventive measures against EHF in the Primorsk were taken first in May 1953 (Preobrazhensky, et al.)¹⁰ when, to fight the rodents in the camping areas, the epidemiologists employed poisonous baits composed of oats and a 5% admixture of Zinc

Phosphide. After a week's trial of this mixture, the number of rodents dropped significantly.

Similar further trials of derodentization were carried out from May to August 1955 in the Shkotov District. The baits were made of wheat groats mixed with 10% Zinc Phosphide, or with 5% Thiosemicarbazide. The baits were laid out at specially controlled and observed experimental areas. They proved effective, and the number of wild rodents, as determined by trapping, was reduced to about one tenth of the number of animals found in the untreated areas.

The next step was an attempt to destroy also the ectoparasites of the rodents simultaneously with their hosts. For this purpose, to the mixture of wheat-groats 10%-Zinc-phosphide, 0.5% DDT, dissolved in vegetable oil, had been added. This is the most economical of the possible procedures, and the mixing of a rodenticide with an insecticide worked very satisfactorily.¹⁰ It acts so that, after the bait is swallowed by the animals, the poisons are absorbed from the intestines, and if there is a sufficient concentration of DDT in the rodent's blood, its blood-sucking parasites, thus the gamasid ticks and other mites, will soon be killed. At a rodent-infested area, DDT dusting of the vegetation will mostly reduce the count of ectoparasites along the runways and near the nests of the rodents (contact effect) (A 10% dust mixture should deposit 1 gram DDT at every square meter). But such dusting of the environment with insecticides was found ineffective against the ectoparasites hiding on the body of the rodents. On the other hand, dusting of the rodents themselves will also kill a few ticks and mites on the beasts.

By the zoologists participating in the investigation¹⁰ the following rodents were found prevalent in the Primorsk "taigas" (jungles):—1) the Far-Eastern field vole (*Microtus fortis* Büchn.); 2) the field mouse (*Apodemus agrarius* Pall.); 3) the Siberian red vole (*Clethrionomys rutilus* Pall.); 4) the Asian forest mouse (*Apodemus speciosus* Then.); 5) the minute mouse (*Mi-*

cromys minutus); 6) the burunduk (*Eutamias sibiricus* Laxm.); and 7) the gray Norwegian rat (*Rattus Norvegicus caraco* Pall.).—The most frequent ectoparasites of these Siberian rodents were:—1) *Laelaps clethrionomydis*, and 2) *Hiritionyssus isabellinus*. Individual specimens of *Laelaps pavlovskiyi* were also found as well as the flea *Ceratophyllus calcarifer*.

Liquidation of "Nature's foci" of the various dangerous infectious diseases is now one of the major goals of Russian medicine as it is also evident from the Interinstitute Conference of Science held at Saratov in the first quarter of this year.²⁰—On the basis of the obtained good results, the combined wheat-groats/Zinc-phosphide/DDT baits are now widely recommended by Russian military surgeons for the practical fight against rodents and mites everywhere at the natural foci of epidemic hemorrhagic fever.

Further foci of epidemic hemorrhagic fever (with renal symptoms) have been reported at other regions of European Russia (Upper Volga Basin, Astrakhan, etc.) and in the Philippine Islands. An analysis of these will be made in a later article.

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Comparison of Some Routine Laboratory Procedures for Diagnosing Rabies

By

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THE most common laboratory procedure for the diagnosis of rabies is the demonstration of Negri bodies in the cytoplasm of neurons by microscopic examination of stained tissue applications or sections of fixed tissues from the brains of animals suspected of having rabies. In some cases where Negri bodies are not found no further diagnostic procedure is performed. In other cases some laboratories attempt to isolate the virus by intracerebral inoculation of laboratory animals with supernates of either 10 or 20 percent suspensions of brain tissue. Occasionally a positive or negative diagnosis is reported solely on the basis of the clinical symptoms exhibited by the inoculated animals. A few laboratories employ a serum-virus neutralization test, in addition to the examination of brain tissue. It is the purpose of this paper to compare the procedures employed and the results obtained by various laboratories in the diagnosis of rabies.

MATERIALS

Diluent—Sterile physiological salt solution containing 1,250 units of penicillin G, and 2.5 mg. of streptomycin sulphate per ml. was employed as the standard diluent.

Laboratory animals—Ten to 15 pound, adult, albino rabbits of either sex and twenty gram, albino, female, Swiss mice (S-P strain), were used as indicated in the methods of procedure.

Control viruses—National Institutes of Health standard challenge virus No. 59 (fixed), referred to as CVS, and Lederle

R174BK222AP99 (7-20-54) rabies street virus, referred to as NY, were supplied by the Fort Dodge Laboratories, Fort Dodge, Iowa.

Test viruses—Twenty-five strains of street rabies virus isolated from various animals were obtained from several diagnostic laboratories. The specimens consisted of frozen brain tissue stored at -30°C . from the time of receipt until used in this evaluation. The methods utilized for the original positive diagnosis and the date of isolation were recorded. Each specimen was assigned a numerical designation and a prefix to identify the species of animal from which it was isolated. No record was maintained to correlate the donating laboratory with the specimens which were furnished.

Sera—Lederle's concentrated anti-rabies serum, dialyzed and filtered (Seitz E-K),¹ was utilized as immune serum for the serum-virus neutralization tests. Filtered (Seitz E-K) equine serum was used as the normal serum.

METHODS

Individual brain tissue emulsions were prepared of each of the following strains of virus: CVS, NY, Canine 1, 2, 3, 4, 5 and 25, Skunk 6 and 7, Feline 8, Bovine 9 and 10, Porcine 11, and Equine 12. Each emulsion was diluted to a 10 percent suspension by weight with standard diluent, centrifuged for 15 minutes at $1,200 \times g$, and one rabbit per strain inoculated intracerebrally with 0.1 ml. of the supernate while under deep ether anesthesia. The inoculated rabbits were observed for a period of 21 days. If a rabbit did not succumb, it was re-inoculated with 0.1 ml. of the homologous virus preparation.

The brain was harvested from each rabbit that died after inoculation or re-inoculation.

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Touch preparations stained according to Seller's method were made of the hippocampus.³ Examinations for Negri bodies were made according to the method described by Tierkel.² The brains of these rabbits were emulsified in a sterile, chilled Waring blender and a 20 percent suspension, by weight, was prepared of each emulsion. These suspensions were subjected to serum-virus neutralization tests.⁴ The normal serum was employed undiluted. The immune serum was diluted 1:10.⁵

The LD₅₀ endpoints in all of the serum-virus neutralization tests were estimated by the method of Reed and Muench.⁶ From these data the indices of mouse LD₅₀ of virus neutralized by the immune serum were determined.

Touch preparations were made of the brains of at least two mice which died in the 10⁻¹ normal serum and virus dilutions of each strain employed in the neutralization tests. These preparations were stained with Seller's stain and examined for the presence of Negri bodies.

Brain tissue emulsions were prepared from animals originally thought to be infected with each of the following strains of virus: CVS, NY, Skunk 13, 14, 15, 16, 17 and 23, Fox 18, Bovine 19, 20 and 21, Equine 22 and Canine 24. Each emulsion was diluted to a 10 percent suspension (by weight), centrifuged 15 minutes at 1,200 x g. and inoculated intracerebrally into five anesthetized mice in 0.03 ml. dosages. These mice were observed for 21 days. The brain was harvested from each mouse which died or was sacrificed and touch preparations were made and examined for Negri bodies.

RESULTS

The methods utilized for the original diagnosis of rabies by the contributing diagnostic laboratories and the date of isolation are shown in Table 1. Six strains of virus, Canine 1, 2, 3, 4, 5, and 25, were originally diagnosed as rabies by the observation of Negri bodies in brain tissue preparations from animals suspected of being infected

with rabies virus. These preparations were stained with the Wilhite stain.⁷ Ten strains of virus: Skunk 6, 7, 13, 14, 15, 16 and 17, Feline 8, Fox 18, and Bovine 19, were similarly diagnosed by the observation of Negri bodies in brain tissue preparations stained with Seller's stain. None of these 16 strains of virus were originally inoculated into laboratory animals.

In nine of the strains of virus (Table 1): Bovine 9, 10, 20 and 21, Porcine 11, Equine 12 and 22, Skunk 23 and Canine 24, Negri bodies were not observed in brain tissue of animals suspected of being infected with rabies virus. The contributing laboratory diagnosed each virus as rabies by the clinical symptoms manifested by inoculated mice. In only one case out of the nine, Equine 12, was the clinical diagnosis in mice confirmed by the examination of impression smears of the brains of those mice which succumbed to the inoculation.

Six of the 15 strains of virus: CVS, NY, and Canine 1, 2, 3 and 4, which were inoculated intracerebrally into rabbits caused death within a normal incubation period (Table 2). The symptoms were similar for all six strains of virus: roughing of the fur in three to five days; incoordination of the hind legs progressing to posterior paralysis in six to 14 days followed by prostration and death in eight to 16 days. With the exception of the CVS (fixed) strains of virus, acidophilic, intracytoplasmic inclusion bodies, of various sizes and shapes with basophilic inner granules were observed within neurons in touch preparations made from the hippocampus of these rabbits. A few similar inclusion bodies were observed extra-cellularly within the stroma of the brain tissue.

Nine of the 15 strains of virus (Table 2): Canine 5 and 25, Skunk 6 and 7, Feline 8, Bovine 9 and 10, Porcine 11 and Equine 12, failed to infect rabbits during the initial 21 day observation period. These rabbits were reinoculated and five strains of virus: Canine 5, Skunk 7, Bovine 9, Porcine 11 and Equine 12, produced a posterior paralysis within two to six days and death within eight

TABLE 1
DATA RELATIVE TO THE RABIES VIRUS STRAINS AT TIME OF RECEIPT
FROM DIAGNOSTIC LABORATORIES

Specimen number	Strain	Date of original isolation	Originally diagnosed by		
			demonstration of Negri bodies in brain tissue applications stained with*	observation of clinical symptoms in inoculated mice in	demonstration of Negri bodies in impression smears of brain tissue from inoculated mice, stained with
1	Canine	Nov 52	Wilhite	—	—
2	Canine	Jan 53	Wilhite	—	—
3	Canine	Feb 53	Wilhite	—	—
4	Canine	Mar 53	Wilhite	—	—
5	Canine	Jan 53	Wilhite	—	—
6	Skunk	May 54	Sellers	—	—
7	Skunk	Nov 55	Sellers	—	—
8	Feline	Nov 55	Sellers	—	—
9	Bovine	July 54	—	12-17 days	—
10	Bovine	Nov 56	—	16 days	—
11	Porcine	Nov 55	—	24 days	—
12	Equine	Mar 55	—	14 days	Sellers
13	Skunk	July 53	Sellers	—	—
14	Skunk	Mar 55	Sellers	—	—
15	Skunk	Mar 55	Sellers	—	—
16	Skunk	July 54	Sellers	—	—
17	Skunk	Mar 55	Sellers	—	—
18	Fox	Nov 55	Sellers	—	—
19	Bovine	Mar 55	Sellers	—	—
20	Bovine	Nov 55	—	11 days	—
21	Bovine	Nov 55	—	16 days	—
22	Equine	Nov 55	—	? days	—
23	Skunk	Mar 55	—	14 days	—
24	Canine	Jan 55	—	18 days	—
25	Canine	Mar 54	Wilhite	—	—

* All specimens were originally examined for Negri bodies; only those in which they were found are shown in this column.

to 18 days. The remaining four strains of virus produced no symptoms within the 21 day observation period following re-inoculation. Acidophilic, intra-cytoplasmic inclusion bodies with basophilic inner granules were not observed in any of the neurons in the touch preparations made from the hippocampus of the re-inoculated rabbits.

The results of the serum-virus neutrali-

zation tests performed with the 11 strains of virus which caused the death of rabbits are shown in Table 3. The validity of these tests was established by the results obtained with the CVS and NY strains of control virus. The control viruses and Canine 1, 2, 3 and 4 strains of test virus demonstrated indices of mouse LD₅₀ of virus neutralized in excess of 100 which positively identified them as

rabies.⁴ Five of the test virus strains failed to meet the requirements for positive identification as rabies virus.

Of the 14 strains of virus inoculated intracerebrally into mice (Table 4) 12 strains: CVS, NY, Skunk 13, 14, 15, 17 and 23, Bovine 19, 20 and 21, Equine 22 and Canine 24, produced clinical symptoms within the 21 day observation period. These symptoms were roughing of fur, tremors when held in the air by the tail, incoordination of the hind legs, posterior paralysis, prostration and finally death. One strain, Skunk 16, produced posterior paralysis on the fifth day following inoculation and death on the sixth day. Another strain, Fox 18, produced no clinical symptoms during the 21 day observation period. The mice inoculated with this strain were sacrificed on the last day of the period. Acidophilic, intra-cytoplasmic inclusion bodies of various sizes and shapes, with basophilic inner granules were observed within neurons in touch preparations made of the brains of the mice which died following inoculation with the NY, Skunk 13, 14,

15, 17 and 23, Bovine 19, 20 and 21 and Canine 24 strains of virus. Such inclusion bodies were not observed in the mice which were inoculated with the CVS (fixed), Skunk 16, Fox 18, and Equine 22 strains of virus.

Of the 27 strains of virus employed in this study, 13 of the test viruses produced results, as depicted in Tables 2, 3 and 4, which would confirm their identity as rabies virus. Both of the control viruses were identified as rabies virus. The majority of the strains which gave negative results had been stored for two months or less. The strains which gave the most conclusive positive results were in most cases those which had been subjected to the longest storage period.

DISCUSSION

The diagnosis of rabies is inadequately pursued in some laboratories. Between 1942 and 1952 more than 96,000 cases of rabies in animals were reported in the United States.^{8,9} These cases, and the tens of thousands that have been reported since 1952

TABLE 2
RESULTS OF RABBIT PASSAGE OF SELECTED SPECIMENS OF RABIES VIRUS

Specimen number	Strain	Days post-inoculation in rabbits		Exam. of touch preparation stained with Sellers stain for Negri bodies
		Paralysis	Death	
CVS	Fixed mouse	7	12	negative
NY	Street canine	6	8	positive
1	Canine	14	16	positive
2	Canine	12	13	positive
3	Canine	11	13	positive
4	Canine	15	18	positive
5	Canine*	21 & 6	21 & 8	negative
6	Skunk*	—	—	—
7	Skunk*	21 & 3	21 & 18	negative
8	Feline*	—	—	—
9	Bovine*	21 & 3	21 & 14	negative
10	Bovine*	—	—	—
11	Porcine*	21 & 2	21 & 10	negative
12	Equine*	21 & 3	21 & 10	negative
25	Canine*	—	—	—

*Rabbits survived one intracerebral inoculation for 21 days and were re-inoculated.

TABLE 3
SERUM-VIRUS NEUTRALIZATION TESTS PERFORMED WITH RABIES VIRUS STRAINS
WHICH CAUSED THE DEATH OF RABBITS

Specimen number	Strain	Serum	Mortality ratio in mice inoc. with serum & virus dilutions					LD ₅₀	Index of Mouse LD ₅₀ of virus neutralized
			10 ⁻¹	10 ⁻²	10 ⁻³	10 ⁻⁴	10 ⁻⁵		
CVS	Fixed mouse	normal	6:6	6:6	6:6	6:6	6:6	10 ^{-4.3}	>24,450
		immune	2:6	0:6	0:6	0:6	0:6	<10 ⁻¹	
NY	Street canine	normal	6:6	6:6	4:6	1:6	0:6	10 ^{-3.3}	> 3,191
		immune	0:6	0:6	0:6	0:6	0:6	<10 ⁻¹	
1	Canine	normal	5:6	4:6	2:6	0:6	0:6	10 ^{-2.43}	>326
		immune	2:6	0:6	0:6	0:6	0:6	<10 ⁻¹	
2	Canine	normal	6:6	6:6	4:6	0:6	0:6	10 ^{-3.91}	> 1,638
		immune	0:6	0:6	0:6	0:6	0:6	<10 ⁻¹	
3	Canine	normal	6:6	6:6	6:6	0:6	0:6	10 ^{-3.5}	>128
		immune	5:6	0:6	0:6	0:6	0:6	10 ^{-1.39}	
4	Canine	normal	6:6	6:6	5:6	0:6	0:6	10 ^{-3.29}	> 1,850
		immune	0:6	0:6	0:6	0:6	0:6	<10 ⁻¹	
5	Canine	normal	0:6	0:6	0:6	0:6	0:6	<10 ⁻¹	—
		immune	0:6	0:6	0:6	0:6	0:6	<10 ⁻¹	
7	Skunk	normal	0:6	0:6	0:6	0:6	0:6	<10 ⁻¹	—
		immune	0:6	0:6	0:6	0:6	0:6	<10 ⁻¹	
9	Bovine	normal	0:6	0:6	0:6	0:6	0:6	<10 ⁻¹	—
		immune	2:6	0:6	0:6	0:6	0:6	<10 ⁻¹	
11	Porcine	normal	1:6	0:6	0:6	0:6	0:6	<10 ⁻¹	—
		immune	0:6	0:6	0:6	0:6	0:6	<10 ⁻¹	
12	Equine	normal	6:6	0:6	0:6	0:6	0:6	10 ⁻¹	—
		immune	6:6	0:6	0:6	0:6	0:6	10 ⁻¹	

were diagnosed by a variety of methods. The test viruses employed in this study were isolated from 25 cases which were reported as positive. Only half could be definitely ascertained to be rabies when subjected to extensive diagnostic procedures.

If the demonstration of Negri bodies in animals thought to be infected with rabies virus is the sole means of making a diagnosis, those cases in which Negri bodies are not produced or are absent for other reasons will be missed. It is also certain that unless extreme caution is exercised in the identification of the inclusion bodies which are ob-

served in such animals, numerous cases will be diagnosed as rabies erroneously. In seven out of 16 cases studied, which were originally diagnosed as rabies by such methods, the virus could not be isolated by animal inoculation or identified by means of the serum-virus neutralization test.

The identification of acidophilic, intracytoplasmic inclusion bodies containing basophilic inner granules, which may appear as a large single granule, within neurons of tissue applications or fixed tissue sections of brain is accepted as diagnostic of rabies. *The term inclusion body is not*

synonymous with Negri body. Inclusion bodies are observed in brain tissue in several diseases and may be confused with Negri bodies by the casual observer. In dogs, foxes and ferrets, the intranuclear inclusion bodies of canine distemper occur in glial cells. They possess a homogenous matrix, have no inner granules, and do not occur in neurons. The virus of canine distemper is not transmissible to mice or rabbits.

In dogs and foxes the intranuclear inclusion bodies of canine hepatitis (fox encephalitis) occur in endothelial cells of the blood vascular structures of the brain. They possess a homogeneous matrix, have no basophilic inner granules, and do not occur in glial cells or neurons. The virus of canine hepatitis is not transmissible to mice or rabbits.

In cats and Swiss mice, and occasionally in other species, non-specific acidophilic inclusion bodies are sometimes observed within the cytoplasm of neurons. Although such inclusion bodies may resemble Negri bodies, they have a homogeneous matrix and none exhibits the characteristic basophilic inner

granules of the Negri body. The cause and significance of these non-specific inclusion bodies is not known. They have been observed occasionally in sacrificed animals which were considered to be normal.

In properly stained preparations of brain tissue from animals which have died of rabies, the Negri bodies with their inner granules are so characteristic that they should be easy to differentiate from inclusion bodies of other types. Negri bodies may vary in size and shape and there may be several within one neuron. Occasionally they may be observed extra-cellularly when neurons are ruptured in the preparation of tissue applications. They do not occur in glial cells or endothelial cells.

While the presence of Negri bodies is diagnostic of rabies, their absence is not proof that the suspect animal was not infected with rabies virus. Negri bodies are not always found in the brain tissue of animals infected with rabies virus. "The length of clinical illness in rabies is directly related to the presence, size, abundance, and development of Negri bodies."² The infec-

TABLE 4
MOUSE PASSAGE OF SELECTED SPECIMENS OF RABIES VIRUS

Specimen number	Strain	Mortality ratio of inoculated mice	Avg. incubation period in days	Exam. of touch preparations stained with Sellers stain for Negri bodies
CVS	Fixed mouse	5:5	7	negative
NY	Street canine	5:5	11	positive
13	Skunk	5:5	15	positive
14	Skunk	5:5	15	positive
15	Skunk	5:5	14	positive
16	Skunk	5:5	6	negative
17	Skunk	5:5	13	positive
18	Fox	0:5	0	negative
19	Bovine	5:5	14	positive
20	Bovine	5:5	14	positive
21	Bovine	5:5	13	positive
22	Equine	5:5	17	negative
23	Skunk	5:5	14	positive
24	Canine	5:5	14	positive

tion may have been overwhelming, and the suspect animal died after a short clinical illness. A similar condition might occur if the suspect animal was destroyed early in the course of the disease instead of being quarantined until it died of the infection. Other diseases or trauma occurring in nature may intervene and possibly account for the death of the animal prior to the culmination of the rabies infection. The demonstration of a disease which could have accounted for the death of a suspect animal does not necessarily eliminate the possibility that the animal is infected with rabies virus.

Perhaps Negri bodies are present in such instances but are absent from the particular section of the brain selected for examination. In all cases where they are not observed, laboratory animals should be inoculated with suspensions of brain tissue emulsion prepared from the suspect animal. This should also be done in every instance in which the responsible laboratory personnel cannot indisputably identify as Negri bodies those inclusion bodies which they may have observed. The animal inoculation procedures employed should follow a recognized procedural guide such as the World Health Organization's monograph on "Laboratory Techniques in Rabies."

If a laboratory does employ animal inoculation procedures for the diagnosis of rabies but relies solely on the interpretation of the clinical symptoms which inoculated animals present, positive rabies will be reported in a wide variety of laboratory animal diseases. In five out of nine cases studied which were originally diagnosed as rabies solely by the interpretation of clinical symptoms exhibited by inoculated animals, rabies virus could not be incriminated by the demonstration of Negri bodies in the brains of inoculated animals or by serum-virus neutralization tests.

Laboratory animals inoculated with rabies virus will evidence various symptoms during the course of their illness. None of these is specific since other diseases of laboratory animals may produce similar symptoms. Therefore, *clinical symptoms in inoculated*

laboratory animals cannot be considered diagnostic of rabies. Positive confirmation is required and can be established by the demonstration of Negri bodies in suitably stained brain tissue preparations from animals which die after inoculation. However, it cannot be assumed that if Negri bodies are not observed the animals are not infected since not all rabies viruses will produce Negri bodies in laboratory animals.

Frequently the titre of rabies virus as it occurs in nature is very low. This factor in combination with the necessary dilution of the brain tissue suspension to adapt it to the inoculation of animals may result in such a low titre of virus that although the animals may sicken, they will not die during the prescribed observation period. In such instances, if they do die, Negri bodies may be too few to be readily detected. Filtration of inoculum to remove bacterial contaminants may have a similar effect, as may also the decontamination of inoculum by high speed centrifugation. There is also the "interference phenomenon" to consider. In some instances, which are not entirely understood, certain rabies viruses may fail to infect susceptible animals when inoculated in high concentrations. Such viruses may require extensive dilution before they will infect susceptible animals.

Inoculated laboratory animals which do not succumb within the prescribed 21-day observation period should be held for an additional week. If they remain healthy, it can be assumed with a fair degree of safety that the suspect animal was not infected with rabies. If inoculated animals do succumb during the initial or extended observation period, or an "interference phenomenon" is suspected, and Negri bodies are not demonstrable, serum-virus neutralization tests should be performed.

The value of the neutralization test was demonstrated by one case which was originally diagnosed as rabies by animal inoculation and subsequent demonstration of Negri bodies in impression smears of the brains of inoculated mice. When brain tissue suspensions from this case were inoculated into

laboratory animals in the present study, the animals died, but Negri bodies could not be demonstrated. When the tissue suspensions were subjected to the serum-virus neutralization test, rabies virus was not identified.

In interpreting the results of the serum-virus neutralization test,⁴ the identity of a suspect virus as rabies is established if 100 LD₅₀ or more of virus is neutralized by the immune serum. If some virus other than rabies is responsible for the death of the inoculated animals, the titre of the suspect virus should be the same in the normal and immune sera. Sometimes neutralization of less than 100 LD₅₀ of virus may be considered to be sufficient for the identification of a suspect virus as rabies. In such cases, brain tissue preparations from those animals which succumb in the neutralization tests may be examined for the presence of Negri bodies. If Negri bodies are demonstrated, the presence of rabies virus has been adequately demonstrated for a positive diagnosis. If they are not demonstrated, the neutralization tests should be repeated.

CONCLUSIONS

Caution should be exercised in the identification of Negri bodies in brain tissue preparations from suspect animals.

If Negri bodies are not demonstrated in brain tissue preparations from suspect animals, animal inoculation procedures should routinely be done.

The diagnosis of rabies in inoculated laboratory animals should never be based solely on the interpretation of clinical symptoms. Brain tissue preparations should routinely be made from those animals which die following inoculation. These should be critically examined for the demonstration of Negri bodies.

If Negri bodies cannot be demonstrated in the brain tissue of those animals which die subsequent to inoculation with suspect rabies virus, serum-virus neutralization tests should routinely be performed.

If less than 100 LD₅₀ of virus is neutralized, brain tissue preparations from those animals which succumb in the neutralization

tests should routinely be examined for Negri bodies.

If Negri bodies are not demonstrated in brain tissue of those animals which succumbed in the neutralization tests, in which the LD₅₀ of virus neutralized was less than 100, the tests should be repeated.

SUMMARY

Twenty-five strains of virus originally identified as rabies virus were evaluated by a combination of diagnostic procedures. Sixteen of the test viruses were originally identified solely on the interpretation of inclusion bodies as Negri bodies in touch preparations of brain tissue from animals suspected of being infected with rabies virus. Negri bodies were not demonstrated in the brains of the suspect animals from which nine of the test viruses were recovered. Eight of these nine viruses were identified as rabies solely on the basis of clinical symptoms exhibited by inoculated animals. Impression smears were prepared from the brains of animals inoculated with one of the nine viruses and the clinical diagnosis was confirmed by the identification of inclusion bodies as Negri bodies.

In this study animal inoculations were carried out with the 25 test and 2 control viruses. Of 13 test strains inoculated into rabbits, 9 produced fatalities. Of 12 test strains inoculated into mice, 11 produced fatalities. The brains of animals which died subsequent to inoculation were examined for Negri bodies. On the basis of the demonstration of Negri bodies, only 4 of the 9 test strains which infected rabbits and 9 of the 11 test strains which infected mice could be identified as rabies virus.

In order to compare the results of animal inoculation tests with those of the serum virus neutralization test, all strains of virus which infected rabbits were subjected to the latter type of test. The results obtained reconfirmed that only 4 of the 9 test viruses could be identified as rabies.

The results of this study indicate that the diagnosis of rabies should not depend solely upon either the demonstration of inclusions

in the host animals or the clinical symptoms of the test animal. If Negri bodies cannot be demonstrated in the brain tissue of animals which die after inoculation with suspect rabies virus, serum-virus neutralization tests should be performed routinely and repeated if necessary.

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Silicones: A Review of Suggested Applications in Medicine and Dentistry*

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ENCOMPASSED within the wide range of protective and useful qualities of silicones, dentistry and medicine has benefited by this chemical. Silicone is an organosilicon compound which was recognized many years ago. In 1870, research chemists, such as Ladenberg in Germany and later Grignard in France, worked with these and other organometallic compounds. Additional credit for early research in the field of organosilicon is due Van Helmont, Berzelius, Mohler, Friedel and Crafts. Although the work on the silicone compounds are interesting, it remained for Professor F. S. Kipping at the University of Nottingham, England, to do the classic researches that laid the foundation for the silicone chemistry as we have come to know it today.¹

Kipping labelled these compounds of silicon, oxygen and hydrocarbons with the misnomer of "silicone." He was working with compounds that had both organic groups and halogens attached to silicon. The halogens were highly reactive toward hydrolytic reagents and produced all sorts of chemical compounds. In attempts to analyze the products of hydrolysis, he obtained ratios of oxygen to silicon that indicated a structure which was the silicon analogue to a ketone—hence the name silicone. Later considerations showed that these products were, in fact, polymers in which the basic structure was that of alternating silicon and oxygen atoms.²

Hunter³ states that, "to understand silicones it is necessary to go back to the chem-

istry of silicon. Silicones may be considered as hybrid polymers. They are built on the skeleton of Si-O-Si structure, as are glass and mineral silicates. The important linkage in these new polymers are the silicon-oxygen and the carbon-silicon bonds and to them are due most of the universal properties of silicones, notably their heat resistance and ability to resist oxidation. Silicones appear in various forms as oils, greases, rubbers and resins.

At the end of World War II certain materials were released from restricted classification by the Government. Among them were the silicones (semiorganic dimethylpolysiloxanes), which have several outstanding attributes that distinguish them from the structurally similar hydrocarbons⁴ (Fig. 1).

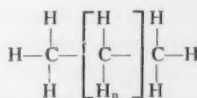


FIG. 1. Hydrocarbon Chain.

Dimethylsilicone is a silicone oil consisting of dimethylpolysiloxane polymers and technically designated as dimethylpolysiloxane of D C 200 series of fluids. The structural formula of dimethylsilicone may be represented as follows (Fig. 2).

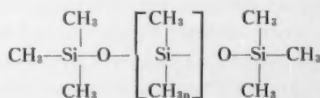


FIG. 2. Polymethyl Siloxane Chain where n ranges from 4,000 to 10,000 giving a very high molecular weight polymer.

Dimethylsilicone does not appear to sensitize the normal skin, however, we should be alerted to the possibility of sensitization

* The opinions expressed in this paper are not those of the Department of the Navy; they are those of the author. Any references to a proprietary drug by chemical formula shall not be construed as an endorsement of that drug or of its efficacy in the treatment of any disease.

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from components of the ointment with which it is incorporated.⁵

Physiological tests with laboratory animals and patch tests on humans indicate that silicone fluids are essentially harmless. However, fluid or vapor in the eyes will cause some irritation although there are no harmful effects.

The silicone fluids, or "oils" are being used as a substitute for water in the sterilization because they have excellent stability even when exposed to the air at high temperatures for long periods of time. It appears that they will last indefinitely at 150° C (302° F). The only fluid that is lost is that which adheres to the instruments during sterilization.⁶ Crowe⁷ draws our attention to the fact that silicone fluids are not corrosive to common metals at temperatures up to 200°C. (392°F.) even in the presence of oxygen. It prevents dulling of sharp instruments. It prevents wear and tear of movable parts while being sterilized.

Silicones have proved useful in the fields of medicine, surgery, veterinary medicine as well as in dentistry, but its greatest use is in industry. Although silicone may be considered to play a minor role in dentistry, its importance must not be overlooked in this branch of the healing arts for the many reasons which will eventually unfold themselves in this paper.

In 1948, Crowley and Ostrander⁸ advocated its use in the dental sterilizer for the sterilization of dental handpieces, since it lubricated its fine mechanisms while it sterilized. When handpieces cooled, the silicone oil did not form a gummy sludge or congeal as would a petroleum oil base medium when chilled. Further disadvantages of a petroleum oil base are the objectional odors produced by the cracking of oils when heated at high temperatures necessary to kill bacteria; in addition, the low flash point of the petroleum oil base is always potentially dangerous. Silicone oil has none of these objectional features. When silicone oil is used as a sterilizing medium there are no inhalation effects, neither are there any obnoxious

odors; and silicone oil has proved to give a working life of up to 40 times that of petroleum oil base lubricants.

Lahey⁹ employs a siliconized rubber tubing in his bile duct repairs with gratifying results. Nickerson and Curry¹⁰ use methyl polysiloxane as a coating agent in gastric ulcerations. Bateman¹¹ and Brusca¹² justify the use of the silicone creams and sprays for the treatment of bed sores as a time saver in nursing care and labor for the bedridden, incontinent, and especially the senile patient, who are so prone to contact dermatitis and decubitus ulcers.

Silicone oil might be used as a lubricant in nitrous-oxide-oxygen gas machines dispensing highly volatile anesthetics which are incompatible with petroleum oil base lubricants. While explosions in the anesthetizing room prior to surgery are rare, they do happen often enough to compel us to take all the necessary precautionary steps and discontinue old practices that invite danger and possible disaster. Silicone oil may be used in these with safety for all concerned.

Leather diaphragms treated with silicone resin remain flexible for long periods of time in the dental socket syringe which may be sterilized without rusting and impairment of the steel spring and of the leather diaphragm. Impregnated washers may serve as anti-creep agents to prevent the leakage of oil and water in the dental cuspidors and aspirating apparatus.

Silicone oils may be used as a hydrophobic agent in biological bottles that are used to dispense antibiotics, drugs and chemicals so that the full benefit of the contents may be utilized.

The aerosol bomb spray,* or dispenser, is the latest innovation in surgical dressings, which when sprayed over the wound, forms a flexible and transparent film. It can be applied more quickly than the gauze dressing, is less bulky and more comfortable, allowing check of wound. It is also water-

* Manufactured by the Aeroplast Corporation, Dayton, Ohio.

proof and does not stick to the wound surface. It has also been proved that silicone does not irritate the skin after repeated applications. Wexler et al.¹³ and Rigler and Adams¹⁴ confirmed the advantages as to economy and the ease of application of this new plastic surgical dressing. Its use as a bandage is enhanced further since water has little or no effect on it. It does not interfere with operative procedures, and, if silicone "Band-Aid" is used, assures comfort, and security from reinfection in small wound and broken surfaces.

As a treatment for Costen's syndrome, Merekeley¹⁵ employs a prosthetic appliance for the mandible, consisting of silicone rubber saddles. Merekeley states, "The silicone appliance is resilient enough to give, on firm occlusion, and it keeps on giving as the teeth are clenched more firmly. In other words, the satisfaction of clenching is defeated since, as the pressure on the silicone saddles is increased it continues to give still more. Thus the habit is broken."

Paynter and his co-workers¹⁶ found in their series of experimental animal assays of various silicone preparations that methyl silicone resins could be used to protect the pulp under silicate cement fillings. An inflammatory reaction was observed in each pulp under fillings which had no liner. This indicated, as Paynter pointed out, "that the methyl silicone resin, when applied to the base of a cavity as a 30 per cent solution in a methyl methacrylate monomer, afforded protection for the pulp against phlogogenic effect of the silicate filling."

Silicone elastomer for impression procedures recently introduced has met with favorable acceptance by the dental profession. It is truly the first entirely different and universal impression material offered. Its many unique properties are as follows: After setting within 4 minutes it becomes a tough elastic, unchangeable gel, which can be drawn over the most severe undercut without fear of distortion or getting an elongated cast. It does not have to be poured immediately or placed in any solution to prevent dehydra-

tion or chemical decomposition. The impression when wiped clean of saliva and dried, may be set aside for several hours before pouring of the model without fear of shrinkage or impairment of the impression.

The silicone elastomer may be used in the taking of a single copper band impression or multiple abutment impressions in crown and bridgework; and even in the construction of full or partial denture techniques. Additional impression material may be added to correct deficiencies after the initial impression. In the single copper band and multiple abutment crown and bridge techniques, the impressions may be electroplated after drying and coating with graphite.

Chemically the product has a silicone elastomer base which is inert, contains no volatile ingredients and resists physical change in temperatures up to 500° F. It may be added that prior to taking of impressions alkaline mouth washes, such as the perborates and hydrogen peroxide should not be used.

One should call attention to the harmful effects which may result from constant washing of the hands with soap and water, and which call for remedial measures. It is not uncommon to find that many practitioners are allergic to soap, which may cause dermatological conditions of the hands. Silicone hand creams and lotions are useful in these cases only after the abatement of the acute stage, when weeping and oozing of the lesions are no longer evident.

A few years ago, protective formulations were introduced containing silicone of the dimethylsiloxane type. In laboratory and clinical investigations, several of them gave genuine promise of protective properties against specific chemicals.¹⁷⁻²⁴

There are many commercial hand creams and lotions on the market. The special plasticized combination of silicone (dimethylpolysiloxane), nitrocellulose and castor oil suspended in a greaseless vanishing cream is the effective ingredients for these hand creams.²⁵⁻²⁹ This cream is not to be applied over weeping or extensive areas of the body. Bathing with boric acid solution several

times a day will cause a diminution of the acute condition, providing the offending allergen is eliminated. Later a silicone hand cream can be applied with safety, morning, noon and night, for a week or ten days until a protective layer forms over the surface of the skin. Frequent bathing with boric acid has caused side-reactions, but occasional bathing is considered helpful and comparatively safe. Applications of the cream once every day or once every two days will replace the worn protective coating. This cream must be rubbed into the hands until it is no longer visible. If total protection of the hands is required, it is applied under the fingernails.

Lebowe³⁰ concluded that, "the silicone oils demonstrated no primary irritation of allergenic sensitization following topical application." His silicone oil (1,000 centistokes in a 15 per cent concentration) in an acid buffered cholesterol absorption base afforded the greatest degree of protection against specific allergens. However, in refractory cases he was compelled to use an antibiotic ointment as an adjunct, if a superimposed secondary staphylococcal infection was also present. Within the past year the topical application of hydrocortisone or 9-alpha fluoro-hydrocortisone has shown much promise in the treatment of inflammatory conditions of the skin and mucous membranes.

Osbourne³¹ states, "Constant bathing is harmful to the skin if soap is used." He augments his statement by statistics which show that natives who seldom take baths had less infectious skin diseases in contrast to those who constantly bathed.

Ordinary soap, regardless of quality, has a pH of more than 9 which means that soap is very alkaline. In individuals who have thin suprapapillary epithelium, a relatively thin horny layer, the epidermal cells are sensitive to the action of the alkali. This condition of the skin is thought by many to be due to a hereditary factor and individuals who are susceptible usually give a history of familial allergic skin disorders and allergies of one sort or another. Silicones have been used

as a palliative measure in X-ray dermatitis, but it is not a permanent safeguard against repeated doses of irradiation.

Gaul³² cautions against dermatitis which may result from over-treatment with proprietary skin remedies, the advertised actions of which are unreliable. Inflammatory cutaneous lesions are often the sites of sensitization dermatitis caused by over-use of antiseptics, germicides, and disinfectants. In this connection it should not be forgotten that procaine and other local anesthetics are capable of producing allergic dermatitis which may also impair the dentist's and oral surgeon's usefulness by prolonged periods of forced idleness.

In the laboratory, the silicone fluids may be used to lubricate glass stoppers to prevent fusing, as a coating in calibrating apparatus, to prevent meniscus formation in fluids; on glass plungers of hypodermic syringes to prevent "freezing"; and for inhibiting violent chemical foaming reactions. Hematologists know that glass coated with a fine film of silicone oil prevents the ready clotting of the blood when withdrawn from the body, thus making it easier to study blood analyses. There is a tendency for blood platelets not to adhere to the sides of the container, thereby delaying clotting time. However, for prolonged clotting time it is advisable to use an anticoagulant, such as Heparin.

Hirschowitz and his co-workers³³ have found that a silicone antifoaming agent (DC 151 Emulsion) will effectively reduce the disturbing bubbling in gastrointestinal examinations and therapy. Silicones with defoaming properties have found a wide application in various manufacturing and chemical procedures, and in veterinary medicine to defoam cattle suffering from bloat.

Barondes³⁴ points out that silicone fluids should aid in retarding absorption of antibiotics and hormones, thus obviating repeated parenteral administrations. Grossman³⁵ employs this delayed action principle in root canal therapy when using polyantibiotics. He uses a preparation of penicillin,

bacitracin, streptomycin and sodium caprylate (PBSC) in a silicone vehicle of 10 centistokes,* DC-200. Grossman³⁶ felt that these drugs in an aqueous solution lost much of their potency after a short while, but in a silicone vehicle (PBSC) lasted many more months before the potency of the antibiotics were spent. However, it is advisable to add a few drops of silicone fluid to the mixture from time to time to maintain its effectiveness.

Silicone, per se, has no therapeutic properties, but it should find a place as a vehicle for the suspensions of barium sulfate enemas, "Lipiodol," etc., as a contrast medium in outlining internal cavities, sinuses and fistula tracts, where a water or an oil base is not desired or is contraindicated. In this way it could assist in the fluoroscopic and X-ray diagnostic procedures.

SUMMARY

Silicones have proved useful in industry, and within the last few years its application has extended to medicine and surgery. In dentistry and oral surgery, silicones have been experimentally employed for the sterilization of handpieces and surgical instruments, in root canal therapy, in full and partial denture technics, crown and bridge-work and as a protective agent for the hands of operators and surgeons.

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Evaluation of Cyclizine with Pyridoxine in Vomiting of Pregnancy

By

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SINCE the relief of nausea and vomiting of pregnancy has been so unpredictable insofar as satisfactory results are concerned, it seems sensible to evaluate any new therapeutic agent which offers a rational approach to the problem.

Such a drug is cyclizine with pyridoxine (supplied as *Maredox*, Burroughs, Wellcome and Co.). Each tablet contains 50 mg. of cyclizine hydrochloride and 50 mg. of pyridoxine hydrochloride.

Cyclizine (*Marezine*) has been widely used as an antiemetic for several years.¹⁻¹⁰ Its antiemetic action is believed to take place at, or in the vicinity of, the chemo-receptor trigger zone,¹¹ interrupting the vomiting stimulus at that point. Cyclizine also effectively depresses the sensitivity of the vestibular apparatus as measured objectively by the microcaloric and galvanic stimulation tests.¹² One of the great advantages of cyclizine is the lack of sedation associated with its use.^{1,2,10} This means that a housewife will not be substituting one debilitating condition (drowsiness) for another (nausea and vomiting).

Within the past decade numerous studies have shown that there is apparently an increased need for pyridoxine during pregnancy.^{13,14,15} This is evidenced by unusually large amounts of xanthurenic acid in the urine. Xanthurenic acid is a degradation product of tryptophane and is excreted in increased amounts when pyridoxine deficiency exists. The administration of 10-15 mg. of pyridoxine per day returns the excretion levels to normal.

The exact "tie-in" between pyridoxine and nausea and vomiting of pregnancy has not yet been unravelled. However, most clini-

cians recognize pyridoxine as being of value in the relief of this unpleasant and occasionally dangerous syndrome.

Because of the well-known influence of emotional factors, including the personality and persuasiveness of the physician, the only satisfactory way to evaluate any drug in this condition is by means of the double-blind technique where neither the physician nor the patient knows which drug is being administered.

METHOD

Two-hundred unselected patients between the sixth and twentieth week of gestation complaining of nausea and/or vomiting were given twenty tablets of either cyclizine with pyridoxine or a placebo with instructions to take two tablets one-half hour before breakfast. The tablets were kept in coded bottles and the identity of what was being given to the patients was not known to the physician until the code was opened at the end of the study. Those patients who obtained relief of morning symptoms with a return of the symptoms in the afternoon were told to take one additional tablet before lunch. There were twelve such patients and it was subsequently discovered that all twelve had been given cyclizine with pyridoxine (*Maredox*).

RESULTS

One-hundred patients received cyclizine with pyridoxine (*Maredox*) and one-hundred received placebos. They were given enough tablets to last ten days. Subjective results of therapy were noted on the patient's charts. Table I presents these results. None of the patients complained of any side effects of any kind with either the placebo or cyclizine with pyridoxine tablets. The fact that all of the twelve patients who

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TABLE I

	Cyclizine with Pyridoxine (Maredox) 100 patients	Placebo 100 patients
Complete Relief*	78	13
Partial Relief	5	5
No Relief	17	82

* 12 patients received 3 tablets daily.

obtained complete relief of their symptoms in the morning with a recurrence in the afternoon were taking the drug was an interesting observation. None of the patients completely relieved of symptoms by the placebo required additional medication during the middle of the day. This might be an indication of the psychological etiology of the nausea and vomiting in those who were completely relieved by the placebo.

Because of the double-blind nature of this study, any influence that the physician might have exercised would have been felt equally by the patients who were receiving both the placebo and the cyclizine with pyridoxine. Many other variable factors are also equalized by the random distribution of the drug and placebo in such a study. Thus, it appears that a combination of cyclizine and pyridoxine is of definite benefit in the treatment of nausea and vomiting of pregnancy.

SUMMARY

Cyclizine with pyridoxine (*Maredox*) and placebos were given to two-hundred unselected patients. Neither the physician nor the patient knew which tablets were given, thus eliminating any psychological or emotional factor.

The cyclizine with pyridoxine afforded complete relief to 78% of the patients, while only 13% of the patients receiving the placebo experienced complete relief of symptoms.

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Toward a Newer Freedom*

By

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IT MIGHT not seem altogether acceptable to some of you who are about to lose what you consider to be your freedom that I who am still free, to your way of thinking, would impose so much upon your good behavior as to offer to point out to you a way "toward a newer freedom."

It is never easy nor is it ever happy to give up a way of life once that way has been established, even if established only in a lesser degree. When circumstances and decisions force us to give up something that is warm and friendly to us, it is all the more difficult to accept even on a temporary basis something that is cold and foreign and strange, and in a sense unfriendly toward our own personal feelings and desires. Thus in giving you Godspeed on your way into what for most of you will be just a sojourn in your professional lives, the easier choice for me would be simply to praise your good manners, your sportsmanship, rather your patriotism by calling it sportsmanship, since none of us at heart is a glory-seeker, actually, and flag-waving just isn't done nowadays. For we are uncomfortable. Not one of us wants the situation in which we and the world find ourselves today. That is just as true as it is trite. Nonetheless it needs to be said. In so saying we give vent to the pressure of our deepest personal feelings, and at times such ventilation is necessary. But certainly this is no time to tell men they are patriotic when indeed they are patriotic. You are just as patriotic as any of us,

only you don't want to be praised about it—not right now, at any rate.

Let us go on then to my text, even though its title may seem to smack of "The Stars and Stripes Forever." May I begin just by naming certain newer freedoms you will meet in the experiences that lie ahead of you. Then permit me to drop back to the basic concepts of freedom in order to show that these concepts are basic to the finer expressions of human understanding and then, last of all, let me point out to you how, more specifically, they relate to the newer freedoms directly ahead and to those in the stored future.

First, I would mention a newer freedom for you in clinical inquiry. Indeed I envy you cordially that newer freedom. It is one in which your clinical inquisitiveness will be hampered little or not at all by the give and take, and the rough and tumble of independent professional life. I can confidently assure you that this particular freedom is, and will be for you a rich reward in the service just ahead of you.

I wish I might dwell more at length on still another and a newer freedom that lies ahead of you clinical people. It will be your becoming part of medical teams that have more of permanence about them, not the pick-up, choose-up kind too often put together from availables and stand-bys. Thus you will be free of the sometimes dreadful responsibility of professional aloneness. To be sure no professional man of integrity and of worth is ever quite alone. Nor does he ever desire to be. Yet he must and often does assume responsibilities advertently or inadvertently which sorely tax his capacities and his belief and his courage in himself beyond that which is ordinarily expected. Yet indeed these are demands that must be met by those who engage with a whole heart in the private practice of the healing arts. None

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of you would willingly lay aside responsibility. None of you, I dare say, would seek or even welcome professional anonymity in order somehow to lose your identity in a faceless team of workers, highly skilled yet highly impersonal. The essential need for warmth, and the essential need for feeling by clinicians who are honest in their intentions and in their motivations leaves such persons insensible to such enticements. It just doesn't register with them. On the other hand, in medical teams of which you will soon become a part, you will find yourselves doing your part secure in the knowledge that on every side of you there are those who are doing theirs, not in competition with you, but in support of you. This indeed you will find to be a newer freedom.

Again, I wish time would permit me to dwell upon the pleasant prospect of a newer freedom to visit and to know new cities, new people, and even cultures different from your own. Man does not live by bread alone, and medical people can not be subsisted successfully on cat-gut, plaster, linens, and microscopes. Here again I envy you cordially the widened range and the wealth of new friendships that lie ahead of you. They will never be quite lost, for their is one sure thing about the Army: whether we are Reserves or Regulars, we never tell each other goodbye. A warm and happy reunion is only a few changes of station ahead, and for those of us who elect civilian life, we need only re-visit the Officers' Club from time to time—"They always come back." Perhaps you do not quite recognize this as a freedom, new or old. But practice thirty years or so in one location and you will find it a freedom all its own, not one to take the place of all others, but one to be enjoyed and cherished.

These, then, are certain of the newer freedoms toward which you are starting. The mention of them here is only mere mention. Even more fully discussed and fully developed they would only be frosting the cake. For a true appreciation, and for value received for your time spent here in listening, let us examine more closely this concept-of-concepts in our American life. Is life still so

dear and peace still so sweet? What has happened to us? What indeed is happening to our innermost happiness?

William Faulkner has recently pointed out to us that our tragedy today is a general and universal fear so long sustained by now that problems of the human spirit have paled almost into insignificance. He avers that there remains only the question: When will we be blown up? This without doubt is an oversimplification. Nonetheless it is because of this—basically—that all of us, the younger of you and those of my generation as well, have come to overlook the problems of the human heart in conflict with itself, and those are the conflicts particularly that bring agony and sweat. Problems of that sort are basic and we must learn to solve them. In doing so we will come to teach ourselves that the basest of all things is to be needlessly anxious and needlessly afraid. Once having taught ourselves that, we may forget it forever and so leave room in our workshops for honor, just pride in accomplishment, compassion, and sacrifice. Until we do that we labor under a curse. It is the curse of fear, of doubt, and baseless suspicion. Laboring under this curse "we gain our victories without hope and our victories leave us no scars." We go on working as though we stand among men and yet watch the end of man. We need more than ever to realize that man is immortal. He has a soul, and his spirit is indeed capable of compassion, and sacrifice, and endurance. Thus above all other things, it is our duty as clinical people to help man endure by reminding him of courage and of honor. Thus we will help to lift up his heart. With this help, man will endure and prevail. And it is our job to see that he does.

Coming closer now to this newer freedom may we remind ourselves that one of the most important, but one of the most difficult things for a powerful mind to do is to become its own master. Accept this and it may be easier to see how it is that "No one is free who has not obtained the empire of himself." This must come about as a revolution from within. But let us remember that

revolutions do not always establish freedoms either in men or in nations. Just as mercy must season justice so must common sense season and balance uncurbed zeal and inordinate evangelism. The history of the world, happy and unhappy, reflects the consciousness of freedom, yet it plainly shows that liberators and liberal institutions born of revolution straightway cease being liberal the moment they are soundly established. None other than Nietzsche tells us that once that establishment is attained, no more grievous or more thorough enemies of freedom ever exist.

All this is basic to the concept of freedom, whether that freedom is new or whether it is old, and no doubt you are wondering how this applies to the feelings of your own hearts. How does this relate to the uniforms you wear, the discipline you accept, the regimentation, if you please, of certain of your activities? Does not all this take from the concept of freedom and degrade your own personal spirit? Quite to the contrary, I assure you. Look around you. There is no more inspiring sight than that of young people working together, and as one who has been in and out of the Army for over 30 years I can promise you that you will go on working together, regimented, if you will, yet there will be no tyranny over your minds. This brings me now to point out to you as Kingsley has done that there are two freedoms—the false, where a man is free to do what he likes; the true, where a man is free to do what he ought. Therein lies the newer freedom; this is the way toward it—a wide, straight, clearly defined and unhampered way for professional practice.

I would be the first to say to you that it is far easier to say than to do; it is easier to preach than to practice. Yet practice becomes easier if there is a formula for practice, if there is a prescription to be filled, and directions to be followed. There are more than a few of these. But just as no patent remedy or panacea can be expected to do all things for all people, at the same time much can be expected and indeed much can be gained if we select a recipe that

comes down more to cases. I offer you one written by that immortal surgeon, John Chalmers Dacosta, whose name surely is known to all of you.

"... Man's creed is one of word and not of action,
The God who scatters manna in the land
For priest-held spirits offer less attraction
Than when he holds a red sword in his hand. . . .

"Then give up the play of idle priestly canting
Go out among mankind with loaf and cup,
Without a thought of praying and of chanting
Give food and drink and raise the fallen up."

Another is given us by Lt. Colonel John McCrae whose poem, "In Flanders Field," (1915) has a deeper significance than we ever quite imagine. I call to your attention here to what McCrae wrote for every medical man, "What I spent, I had; what I saved, I lost; what I gave, I have."

What to do with this recipe, this prescription. Use it to store up treasures that will come back to you in the consciousness of duty well done, in the satisfaction of selfless acts performed. That which you have given away freely, you will yet possess.

It is indeed easier to preach than to practice. It is easier to say than to do. The world around us and our daily tasks demand so much that with the best intentions carefully spelled out for us it is not always readily possible to put these nobler concepts to work. Man's creed too often is one of word and not of action. The press of everyday demands frustrates our noble thoughts and our best intentions. Ward rounds must be done; paper work must be taken care of; meetings must be attended; routine is demanded as a part of duty. The best of intentions, the best concepts, the best laid plans often "gang a-gley" simply because time and circumstance do not permit their nurture and growth. Too often ideals have to be stored away and taken out when time permits, not always even when the spirit moves us. Strive, nevertheless, to "Keep thy heart with all diligence for out of it are the issues of life."

So I point then to this newer freedom. It is a freedom more to put these concepts to use than ever so far has been your privilege

or opportunity in your short professional lives. I say again that you are indeed given a newer freedom in a newer opportunity for clinical inquiry, a newer freedom for independent thought and research released as you are for the time being at least for combatting the exigencies of a private professional life; moreover, you soon will be relieved of working with a feeling of professional aloneness. Instead you will be steadfastly supported on every side by those whose purposes are just as lofty and just as sincere as your own. This is a newer freedom and I urge you to grasp it and use it and thus progress toward the fulfilment of the hopes and ambitions that motivated your entering a service which is greater

perhaps than you will ever know.

I adjure you to use this newer freedom for a re-planting, a deeper planting of your ideals and for a deeper understanding of yourselves. Do make the most of this opportunity to allow basic concepts a new chance for substantial rooting so that as time goes on and adversities come to bear upon your best efforts, the honest expression of what you are trying to do will not be just priestly canting. Let your loaf and cup give you a newer freedom from self and thus a freedom from selfishness, the freedom "that surpasseth all understanding." May you pray to use it reverently. May you ever employ it toward the maintenance of justice among men.



A Visit to a Dermatological Center in Soviet Russia*

By

J. HARRY KATZ, M.D.†

WHEN announcement was made in the press last year that State Department restrictions on travel to the Soviet Union were being lifted and that the Russians would welcome American travelers, I decided to make a visit to one or more of the dermatological centers of Soviet Russia.

After a great deal of difficulty, particularly with visas, my wife and I found ourselves on August 10th, 1956, at the Hotel Metropole in Moscow. Shortly after we arrived in Moscow I applied at the Intourist Bureau for permission to visit a dermatological hospital. This request apparently took the authorities aback, since visiting doctors were usually taken to the great general and surgical hospitals in Moscow. There had been no visiting Western dermatologist since before the war. However, three days later I was told that arrangements had been made and that my wife and I could visit the dermatological hospital the next morning.

At about 10 o'clock our guide met us in the Hotel Metropole lobby and escorted us to a chauffeured car waiting outside. Vladimir, our guide and interpreter as well, was a handsome young Russian in his early twenties, neatly dressed but with an aversion to wearing neckties. He spoke excellent English with a definite American inflection. I asked him about his American accent, and he explained that he had studied English in college under a teacher who was an American expatriate.

We drove through what seemed to be miles of streets lined with old buildings, some of them actually built of logs, to the hospital, which was located in one of the oldest

sections of the city. Our car stopped in front of the main building of the hospital (there is no parking problem in Moscow). This building was about four stories high, of old brick and crumbling stucco; it was set back from the street with an iron fence at the sidewalk, and shrubbery between the sidewalk and building. The entrance was most unimpressive. The building itself was very old and must have been old when the Soviet regime swept into power in 1918. As far as I could see, no changes or alterations in the physical plant of the hospital had been made since then, and it must appear today very much as it appeared in the days of the Czar, except for the ravages of time and use.

We entered the building into what might be called a lobby. This was bare and in need of painting. Through the rear window we could see patients strolling in the courtyard in pajamas. From the lobby we were ushered into an office and introduced to the assistant medical director, Dr. Demganovich, a handsome courtly gentleman with a small Van Dyke beard and a kindly, courteous manner. Dr. Demganovich explained, through our interpreter, that there were four other institutions in Moscow similar to the one we were in, but that this one was the largest and leading institution of its kind. He went on to explain that considerable research was performed at this hospital (or academy, as he referred to it) and that many physicians were trained in dermatology and urology.

He then asked me if there was any special field that I was interested in. I told him that I was particularly interested in dermatology and not in urology. He excused himself and returned in a few minutes to tell us that Professor Smirlov was ready to show us his clinic. He accompanied us outside into the hall, where he introduced us to a doctor whose name I could not pronounce, much

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less spell. This doctor was a distinguished looking dark-haired man with a black goatee, merry eyes, and a charming smile. While we were talking, a nurse came over with unstarched wrinkled white gowns, which we put on over our street clothes. We were then ushered into a tiny rickety wire-cage elevator which the three of us filled. We were escorted into a large room, where about a dozen doctors in white gowns were seated. They rose when we entered, and I noticed that about half of them were women. It seemed to me that women predominated among the younger physicians and men among the older. We were introduced with much bowing and hand shaking to each of the doctors and then were given seats at the head of a semicircle of chairs in the center of the room. On one side of the room there were many moulages of skin diseases placed on tables against the wall. There were two white canvas screens near the door, but aside from this the room was bare. The doctors sat quietly chatting and looking at us. They seemed somewhat ill at ease, and so were we.

A moment or two later the door opened quickly, and a balding, stocky white-gowned man with pince-nez strode in rapidly. Everyone rose, including us. The newcomer smiled and spoke to our interpreter, who introduced us. He was Professor Smirlov, Professor of Dermatology. All of the doctors obviously treated him with a great deal of respect and remained standing while he spoke to us.

Professor Smirlov sat down next to me and proceeded to ask me some questions through my interpreter. The staff listened attentively and obviously with great interest. He asked me where I practiced and what my hospital connections were. He knew of none of the hospitals that I mentioned, and it was obvious after a few more questions that his knowledge of American dermatology was somewhat sketchy, almost as sketchy as my knowledge of Russian dermatology. He stated that he had recently been to America and attended a dermatological conference in Washington, D.C. He looked at me rather sharply and said, "I did not see you there,

why?" The question startled me and left me rather embarrassed since I did not even know to which conference he was referring. The implication was strong that if I were a bonafide dermatologist I should have been at that conference. I stammered some excuse.

About this time a woman was brought in and was partially disrobed behind the screen with the assistance of one of the women physicians. She was then brought forward within the circle of chairs to a chair in front of Professor Smirlov and me. Professor Smirlov then gave me a rapid account of the patient's history and diagnosis, which was chronic discoid lupus erythematosus. Most of his discourse was beyond my interpreter's powers of translation; however, many of the Russian medical terms are derived from the Latin, and I was able to understand quite a bit. Many more cases were presented in the same manner. There were several cases of lymphomas with dermatologic manifestations. Moulages had been prepared of some of the cases, and these were proudly handed to me for comparisons as the cases were presented.

I must say that I have never seen such excellent representations as these moulages. They made us wonder if the faces of Stalin and Lenin lying in their red granite mausoleum on Red Square were not moulages, perhaps made by the same artist. I remember one case where a patient suffering from reticular-cell sarcoma was presented side by side with a life-size moulage of his head. The moulage was an identical likeness—each lesion, each hair, each pit and pore were duplicated exactly. Professor Smirlov asked if we used moulages in America, and I told him that we relied on color photography and that moulages were rarely made in America.

Two or three cases of disseminated lupus erythematosus were presented, all of them young women. These were convalescent cases which Professor Smirlov stated had been cured with corticotropin. He went on to say that when he was in the United States he was told by a prominent dermatologist that corticotropin did not cure disseminated lupus

erythematosus, only suppressed the symptoms. The Professor said that he could not understand this statement since they had cured several cases with corticotropin. Another case of chronic lupus erythematosus was presented, and very proudly the Professor said that this case was getting well through a Soviet discovery—quinacrine—and that the rest of the world was following in the Russian wake, at least in this respect.

A patient with mycosis fungoides was presented, and I was asked how we would treat such a case in America. I told him probably with superficial x-ray therapy. Professor Smirlov stated that this type of treatment was rarely used at his institution. They used radioactive cobalt instead, not only for mycosis fungoides, but also for other conditions where x-ray therapy was indicated.

When all of the cases (about a dozen) were presented, Professor Smirlov arose, shook hands with all of us, and politely took his leave. We then shook hands with the rest of the staff individually and were escorted by our friend with the black goatee through many old narrow corridors to various departments in the building. We were shown the pathological laboratories, which consisted of several small rooms containing tables and benches with a few old microscopes, various bottles with reagents, and pathological specimens, and little else in the way of equipment.

In one room there were two women technicians peering into microscopes. This laboratory was apparently devoted to tissue study and was supervised by a very distinguished-appearing woman doctor with pince-nez. She was introduced to us and spoke in halting English. Aside from one of the younger women doctors in the clinic, she was the only doctor we met who spoke or understood any English.

We were shown several laboratories which were devoted to Wassermann tests and examination of urethral smears for gonococci. One small laboratory was devoted to research in syphilology. Here rabbits were inoculated with treponema organisms to study the effect of various spirocheticides.

We were taken through many halls to the mycological department and were shown to a small office with an adjoining laboratory. This was the office of the mycologist, to whom we were introduced. He was very gracious and showed me around his office. There were several old mycological classification charts on the walls, all printed in Cyrillic alphabet. However the titles were sufficiently close to their Latin derivations that I could guess their meaning.

The Russian dermatologists do not use Sabouraud's classification of pathogenic superficial fungi but apparently a classification of their own. I asked more about the classification, but our interpreter could neither understand nor translate the doctor's reply. However, from what I was able to understand, their classification is based on cultural characteristics of the fungi rather than the type of tissue invasion. A woman technician in a white gown brought in many cultures of fungi in Petri dishes for me to examine. What we refer to as *Trichophyton gypsum* or mentagrophytes they refer to as *T. granulolum* and *T. flocculosum*, dividing it according to cultural characteristics. As we were leaving the doctor's office I noticed a new copy of the A.M.A. Archives of Dermatology—May, 1956, issue—lying on his desk. I asked the doctor if they regularly obtained this journal and was assured that they did. He further stated that they obtained copies even through World War II. In the collection of books on the desk I saw one American book, an old well-thumbed copy of Lewis and Hopper's "Mycology." I asked the doctor if he could read English. He replied in the affirmative but he said that he could not speak it or understand it when spoken.

We were next taken to a large room, which was apparently used as a lecture or assembly room. Along the walls were glass cases containing many moulages of skin diseases. We slowly walked along the sides of the room with our interpreter and the doctor with the black goatee, studying the moulages. The collection of moulages was quite ex-

tensive and included many cases of favus of the scalp.

We returned to the main lobby, and here I expressed a desire to see the wards. There was some discussion among the interpreter, our friend with the black goatee, and Dr. Demganovich, the assistant medical director, who joined us here in the lobby. It was obvious that there was some reluctance to take us to the wards, but I said that we would like to see them, if the doctors didn't mind. They shrugged and smiled acquiescence.

We walked up to the third floor where the wards were situated. When we reached them we saw why they were reluctant to show them to us. The entire section was dingy and old. The wards (there are no private rooms; only patients in terminal stages have a room of their own) consisted of small rooms containing about six beds each, and opening onto a narrow hall. The wards were reasonably clean, as clean as a very old, poorly maintained building would permit. All of the beds seemed to be occupied, in both the male and the female sections. There were various dermatoses represented, including several cases of pemphigus. These latter patients were receiving corticotropin and cortisone. When I asked if these drugs were readily available, I was told emphatically that they were.

In a small alcove in the hall was a table and chair. These were for the resident physician. Next to the alcove was a door which opened into a small bedroom. This was for the resident on night duty. There was a doctor on floor duty twenty-four hours a day.

All hospitalization as well as all medical care in Russia is free. There is no such thing as private medical care. One of the doctors told me that he understood that we could not study our cases as thoroughly in America as in Russia because of the reluctance of private patients to be studied. All of the Soviet doctors we met thought that their system was much the better. This prejudice can be easily understood, when one realizes that only the very old physicians have had any experience with any system of medicine other than government medicine.

I asked my guide if most of the doctors were members of the Communist Party. He stated that it was his knowledge that hardly any of them were, and that it was not a prerequisite for any hospital position. The majority of doctors apparently keep aloof from party politics.

We left the wards and walked down the stairs to the main floor, where we were told that the medical director would like to see us in his private office. We were taken to a room opposite the office of the assistant medical director and were ushered in. This was a large office with a huge polished table in the center of the room, resembling the table in a board of directors room in America. At one end of the table sat the medical director, a swarthy man with thick, dark unruly hair. He, unlike all of the other doctors, wore no white coat over his street clothes and did not have the professional bearing so characteristic of the doctors we had already met. Seated by his side was a carefully groomed doctor with a small mustache, who was introduced as Dr. Rosenberg, the head of the department of syphilis.

We were very graciously received by the director, who immediately asked me what I thought of what I had seen at his hospital. I told him that I was favorably impressed. Dr. Rosenberg then asked me the method of treating syphilis in the United States. I told him that we used penicillin almost exclusively.

"What about arsenic and bismuth and the other heavy metals?" he asked.

"These drugs are rarely used any more in the treatment of syphilis in the United States," I told him. "The antibiotics have supplanted them almost entirely."

Dr. Rosenberg made a grimace, and I in turn asked him, in surprise, if penicillin was not the treatment for syphilis in Russia.

"Yes," said Dr. Rosenberg, "but we also give bismuth and arsenic. We alternate series of arsenical and bismuth and in addition we give penicillin. We do not believe, in Russia, that penicillin alone is adequate treatment."

"How long do you continue administering

these alternate series of injections?" I asked.

"Until the Wassermann is negative," he replied.

"But," I said, "suppose you have a Wassermann-fast case?"

"We do not recognize what you call Wassermann-fast," he said. "We feel that the Wassermann test is an accurate and sure test for syphilis and a positive indication for further treatment."

"We certainly do not agree with that in America, and I feel that our results justify our method of treatment."

"You in America will eventually regret your dependence on penicillin," Dr. Rosenberg replied. "Many of the cases you think are cured are really not."

We spoke a little more about syphilis, and then I asked a question regarding penicillin reactions. Dr. Rosenberg told me that penicillin reactions were absolutely unknown in Russia. They had read of them occurring in America and Europe but they had never seen any.

I said that perhaps this was due to the fact that they had not used penicillin as long as we had.

He looked at me rather sternly and said, "Perhaps your penicillin is no good." I saw no point in replying.

I asked if they had any other antibiotics and learned that they had chlortetracycline, oxytetracycline, streptomycin, and, to my great surprise, "Albamycin." However, I later learned that this last antibiotic was not novobiocin but a strictly Russian one made from *Actinomyces subtypicus*.

The medical director then asked me what the government regulations were regarding the treatment of syphilis in the United States. I told him that the government in America did not regulate any medical treatment and that each doctor was free to treat his patients as he thought best, according to the general standards of treatment in his community.

I could see that they thought that this was a very disorganized way of practicing. I did not press the point, but said that unless there

were some more questions I would not take up any more of their time. We all rose and shook hands. The assistant medical director made a little speech, saying that they had only one hope and desire, and that was that our people would live together in peace and that there should be a constant mutual exchange of medical information. He hoped for more visits of American doctors to Russia and also expressed the hope that it would become easier for Russian doctors to visit the United States. He was referring to our fingerprinting regulations for visiting foreigners, which the Russians resent very much.

In turn, I said that it was the desire of all Americans that we should live in mutual peace and understanding. With a flurry of smiles, goodbyes, and handshakes we left. Not until we were in the car and many blocks away did I suddenly remember that, in spite of my camera slung over my shoulder as a constant reminder, I had completely forgotten to take any pictures.

In retrospect I must say that I found my visit to be an extremely interesting one. Although the buildings and equipment were quite old and inadequate according to our standards, I was impressed with the caliber of the medical staff. The doctors were obviously dedicated, sincere men. Their medical education was of excellent quality, and, although their opinions might differ with ours in various aspects of medical therapeutics, I would not hesitate to say that their patients received, in general, good medical care. It is interesting to note, however, that the Russian dermatologists were not particularly interested in the cosmetic aspects of certain skin diseases, or in the removal of blemishes, benign growths, or scars.

As far as medical equipment was concerned, although what we saw at the Dermatological Academy was old and inadequate, we did see examples of fine new Russian medical equipment at an exhibition in Moscow. It was obvious that most of this was copied from American and European models. However this impressive new equipment—

x-ray apparatus, diagnostic machines, instruments for cardiovascular surgery, etc.—is not in general distribution in Russia and at present serves chiefly as a means of propaganda, not only for visitors but for their own people. In most respects what I saw of Russian medical facilities and equipment was inferior to what we are accustomed to see in America. Speaking from my own observa-

tions, I cannot foresee how, under their present system of government control, Soviet medicine can equal the achievements of Western medicine. They must be content with imitating our progress even if they do not give us credit for it.

30 East 60th St.,
New York 22, N.Y.



TRAINING IN EPIDEMIOLOGY

A multidiscipline course in *Principles of Epidemiology* will be offered at the Communicable Disease Center, Public Health Service, Atlanta, January 13-17, 1958, as a part of the continuing program of the Center's Training Branch.

Designed to provide public health workers with a basic understanding of how epidemiological techniques can be used in an approach to the solution of problems in the preventable disease field, the course is offered for the following categories of public health personnel: physicians, dentists, veterinarians, nurses, laboratory workers, environmental health personnel and other members of the public health team. Participants will be selected on the basis of professional education and experience and current responsibility in public health programs at all levels of government. Preference will be given to persons whose professional tasks involve the application of epidemiological procedures, and registrants will be expected to attend all sessions of the course.

Further information and application forms may be obtained from: Chief, Communicable Disease Center, Public Health Service, 50 Seventh Street, N.E., Atlanta 23, Georgia. Attention: Chief, Training Branch.

EDITORIAL

Sputnik

HARDLY three months after the commencement of the International Geophysical Year, the Kremlin surprised us by sending a new kind of "Fellow-Traveller" around the world. Military observers of the fighting technic and strategy of Communist Russia assure us that the element of surprise is very highly esteemed in the Soviet conduct of warfare. Hence, the manner in which Sputnik, the little ball, was thrown into the world has a very special significance, and the circumstances of its delivery reveal the true character of the Soviet leaders' slyness. Learning from the past history, the Western World had every right thus to suspect this new gift of the communists.

The little Red Moon, aside from its probable scientific mission, had achieved its main objective: it confused the non-Communist world, and in the confused minds it created the momentous impression of the invincibility and superiority of the Soviet way of life. This impression was, however, apt to weaken soon by the bullying attitude of the Soviet political leaders toward the rest of the world, a gesture of menace which almost coincided with the debut of the satellite.

Now, we may conclude that Sputnik is both a camouflage and a threat. Its spectacular and sudden launching on the fourth of October was such an extraordinary event in the history of the entire world that everyone's attention was easily diverted from the memory of the rape committed by Russian Communists on a small God-fearing nation of Eastern Europe just about a year ago. Sputnik is an excellent curtain to hide those atrocities with which Soviet guns and tanks and their barbarian leaders butchered thousands of Hungarian young patriots into

martyrdom in last November while they sought liberation from their fetters of Communist-enforced slavery.

Indeed, Sputnik seems to be the token fist of the megalomaniac Kremlin, the fist thrust up toward Heaven to challenge the Universe and to widen the orbit of Soviet domination on Earth. In this respect, the Red Moon has no semblance to our ancient Moon, which implies serenity while Sputnik appears rather as a messenger of Mars, increasing the fridity of the cold war. With its Earth-enwrapping circles, it functions as a symbol of Evil, and represents a step forward toward the horrors of a violent global warfare of the Future when perfected monsters of Technic, launched by powerful rockets and guided by robot eyes, will try to impress the mode of living of some human monsters, their rulers, upon the free nations of the Earth.

Yet, in spite of all its frightening aspects, the little satellite is still drawing our eyes to gaze up to the sky with beating heart and parted lips. This is natural and easy to understand. After all, every one of us, human beings, has in himself a particle of that yearning which drove Icarus into the unknown Space and attracted him to the Sun, and each one of us has a bit of that rebelliousness which Prometheus, the Titan of the Greek myth, possessed when he stole fire from the gods to preserve mankind.

Sputnik, as a purely scientific achievement, is a little bit of powerful Promethean knowledge stolen from Nature, and we should draw an inspiration from its force to fashion a better and more beautiful world for ourselves, since it is our destiny, and it depends upon the Good-will of all of us, to shape this modern Promethean stolen good into an obedient tool for the peaceful service and the preservation of the Human Race.

Sputnik II now circles the World, and we are told there will be a Sputnik III. After that what? There will, of course, be more Sputniks or whatever one may wish to call them. The fact that the Russians were able to launch these satellites is convincing proof

that when an all out effort is made to get a job done great things happen.

The Star of Bethlehem once guided Wise Men to Him who ushered in a new era in the world. What new era is in store for men now?



Nuclear Reactor

The first nuclear reactor to be installed in a hospital for medical use was dedicated at the U. S. Naval Hospital, National Naval Medical Center, Bethesda, Maryland, on November 15, 1957.

The Honorable Sterling Cole, Member of Congress, Director General, International Atomic Energy Agency, was guest speaker.

Prominent individuals at the ceremony were: The Under Secretary of the Navy, the Honorable William B. Franke; the Surgeon General of the Navy, Rear Admiral Bartholomew W. Hogan; Rear Admiral Thomas F. Cooper, MC, USN, Commanding Officer of the National Naval Medical Center; Captain Edward C. Kenney, MC, USN, Commanding Officer of the U. S. Naval Hospital; Captain E. Richard King, MC, USN, Head of the Medical Center's Nuclear Reactor Project Committee; and Mr. Dan Kimball, former Secretary of the Navy and now President of the Aerojet-General Nucleonics Laboratories, manufacturers of the reactor.

Admiral Hogan said, "Because of the

distance and time involved in transportation, radioactive materials with short half life have not been utilized. Now short half life radioactive material will be available for use in clinical research and study. The reactor staff has many plans for the application and use of this reactor.

"This reactor will give to the clinical services of the hospital a new method of determination of electrolyte concentration. This method is known as neutron activation analysis, and is the analysis of tissues and body fluids after irradiation in the reactor. This type of testing will supplement and replace many of the present laboratory procedures such as the determination of the concentration of sodium, potassium, chlorides and other elements in the blood. In addition, this method of tissue analysis will open new vistas and opportunities for the study of disease processes, and their effects upon the structure of the human body. These benefits to medical science will be shared with the medical departments of the other military forces and our civilian medical friends."

Around the World

(Ser. II, No. 16)

By

CLAUDIUS F. MAYER, M.D.

PAU is city of France, about 800 kilometers SW from Paris, and very near to Biarritz. It is *surrounded by the Pyrenean Mountains*, and has a very suitable geographical situation for *bioclimatological research*. Here, a new center opened where scholars will have an opportunity to study atmospheric ionization, solar radiation, etc. Much effort will be made to study also the effects of climate upon the organisms, especially in connection with weather sensitiveness, influence of the weather upon cardiovascular and nervous systems.

With every means at her disposal France tries very hard to maintain her rank in the world of science. Just about a year ago, some 200 French scholars congregated in Caen for discussion of the *pitiful state of scientific research in France*. They went so far as to talk of an actual "marasmus" of French scientific investigations, and to demand a thorough reform of education, even a reform of the spirit of the faculties of medicine and science at the French universities. The three main causes of the weakness of French science, or of any national science, are: (1) a rigid administrative structure of the schools and universities, (2) lack of personnel and matériel at the establishments of higher learning, and (3) the mediocrity of the professions and of the researches open to learned men. In 1936, when the National Research Center was created in France it was hoped that the new creation would be able to solve the problem. Indeed, it did save French science from total disaster but it hardly solved the problem. Rather, it seems to us, it helped to bring everything upon a common level of mediocrity.

For almost half a century it has been suspected that the *virus of smallpox is imported to Great Britain on raw cotton*. Studies in the London Central Public Health Labora-

tory proved that such an importation is indeed possible. The variola virus can survive on raw cotton as long as four months. A few particles of the virus may survive even for as long as 18 months. But if cotton were stored in a tropical country at the existing outside temperature and moisture, for at least six months, smallpox propagation is very unlikely through the medium of cotton.

How much *yearly medical service* is provided by a single doctor in an English rural dispensing practice? Here are the statistics of a doctor of Filkins, England, published a few months ago: calculated number of National Health Service (NHS) patients seen by him . . . 1,161; private patients . . . 46; total number of domestic visits to NMS patients . . . 3,459; to private patients . . . 250; number of office consultations . . . about 7,000; private . . . 45. Number of prescriptions dispensed—4,280; total number of deaths 27 (at average age of 75½ years) (20 died at home, 7 in hospitals); total number of births . . . 21 (10 deliveries at home); total number of abortions . . . 5; How much was the doctor's total income?!

For the Royal Army Medical College in Millbank, London, this year marked a jubilee. The center was opened in 1907 for the teaching of the basic subjects of military medicine (health, pathology, surgery, tropical medicine and psychiatry). The original Army Medical School was founded soon after the Crimean War, in 1860, at Fort Pitt, Chatham, and later transferred to the Royal Victoria Hospital in Netley (in 1863).

During the period Sept. 1955 to Aug. 1956, while the Eoka "terrorists" were in action in Cyprus, a Commando of the Royal Marines was engaged against them. This Commando had a small medical staff consisting of medical officer, one S.B.P.O., one

L.S.B.A. and 4 S.B.A.s. During the time, 24 casualties passed through the hands of this small staff. At the beginning, the Commando was stationed at Limasso, and there was no shortage in facilities for transportation and hospitalization. Later, when the Commando was operating at the western end of the island, evacuation of the casualties was either by the usual Army ambulance, or by helicopter. The Commando had four camps, several miles apart. Each camp had an SBA attached. The role of the Commando medical staff was chiefly the provision of first aid, and in some cases resuscitation, and the arrangement for evacuation of the hospital cases. Great value was found in the use of such blood substitutes as Dextran, since the rough terrain made any kind of cross-matching of blood impossible. Only in an extreme emergency was blood given. The Cyprus fight again gave an opportunity to show the superiority of air evacuation in roadless or mountainous districts.

In these days of tranquilizers and other sedatives and analgesics many people wonder whether the modern tendency of pain-killing and *peace-creating by means of drugs* is right from the point of view of the individual, of society, and of Mankind. Last year, on occasion of their annual meeting, with some of their moral problems the Italian anesthetists approached the Holy Father who then, at a Pontifical audience, exposed the views of the Catholic Church about the moral and *religious angles of the suppression of pain* which *a priori* seems to be contrary to religious heroism. The principles of anesthesia are in no way in contrast with either the natural moral order or the particularly Christian ideals, said Pope Pius. The physician's function in seeking the relief of pain by means of science and technic is of a truly Christian order. Similarly, a patient may take the customary drugs for alleviation of his pains lest such an act becomes immoral for some reason. Thus, general anesthesia is also permissible from a moral point of view and compatible with the spirit of the Gospel. The practice is however to be condemned when anesthetic drugs are ad-

ministered to a moribund person against his expressed will. The duty of the physician is to advise the moribund person of his condition and to suggest to him his last duties on earth all of which require clear mind and consciousness. But, if the patient insists upon the immediate use of anesthetics, his desire must be decisive for the doctor's action. Anesthetic or analgesic drugs whose major action is the alleviation of suffering while their minor untoward effect is the shortening of life are morally permitted to use only if there is no other way to relieve pain or to cure the patient, announced the Holy Father.

To any traveler in *Asia* it may be shocking to see how little is being attempted even in the more prosperous villages, to bring about at least the most *primitive form of public health*. This is so since very few people see any direct relationship between health measures and economic return. One of the reasons why antimalarial campaigns have a better success is the recognition of their economic return. Public health programs are long-term programs and they do not stimulate the people to action in the same way. Moreover, the capital for public health is very small so that not much can be accomplished. Of course, the sanitary conditions are greatly responsible for the many epidemic diseases. In India as well as in other parts of Asia, private latrines are almost non-existent in the villages. Public latrines are used only when someone is too sick and cannot go on the fields. Most Asian countries have governments which desire to modernize their countries. But they go about it in the wrong way. They would begin by building a nuclear reactor, before even supplying the most essential needs of the people.

Ceylon as an island is about two-thirds dry and one-third wet. The wet areas are covered by jungle, and are less suitable for cultivation. The dry zone, with appropriate irrigation, is the best for agriculture. In the history of *Ceylon*, the dry zone was admirably provided by the ancient *Sinhalese kings with irrigation plants*, until about the 13th century. Already in the first century A.D.,

large-scale irrigation works were built, some of which are still in existence. There are three or four such monumental tanks, each with a capacity of several thousand acre-feet (70,000). It seems that these places were abandoned on account of malaria which was imported by enemy invaders. Now, Ceylon has developed a program of resettlement. Since malaria is now conquered in the dry zone, there may come again a new flourish at the site of the ancient Sinhalese culture.

India's annual tea production is over 600 million tons. Close to $\frac{3}{4}$ of the production is exported. A large amount of the tea leaves is unfit for table use. This tea wastage is a cheap and important source of caffeine. Efforts among the Indian pharmacological companies are directed to the preparation of domestic caffeine that the imported synthetic product can be soon eliminated from the market. India's demand is ca. 30,000 Kg. of caffeine annually. Hence, the New Delhi government is willing to help any small industrialist who wants to develop this promising branch of the pharmaceutical industry.

Members of Tokushima University (Japan) studied a form of dental disease which is common in the ASO volcano district of Kumamoto Prefecture in Japan. The disease is called "yonaba" by the natives, which means "teeth affected by volcano ash." To a western physician it would look like mottled teeth. These volcano areas are marked by waters with high fluorine content. Earlier, several Japanese scholars reported changes in the heart as a result of fluorosis. Inhabitants of the Mount Aso district were, therefore, examined with electrocardiograph. The research indicated a higher incidence of myocardial changes in the high-fluorine areas. The majority of persons with damaged hearts also had mottled teeth. Such electrocardiographic changes varied from premature ventricular beats to frank coronary insufficiency.

The two great health problems which plagued the Medical Department of the French Naval Division in Viet Nam during 1950-1955 were alcoholism and venereal diseases. The two evils go hand in hand. One

of the factors of the increase in the number of drunkards is the particular toxicity of the local alcoholic beverages. Even a small amount of the local beer in Saigon will very quickly inebriate a man since it also contains "shoum," or rice alcohol, apt to cause a rapid intoxication. Perhaps there may not be seen as many dead-drunk sailors lying along the sidewalks or in the gutters of Saigon as before 1950, yet an increase in chronic addiction was noted among the officers, in spite of the various educational and disciplinary measures. The fight against venereal diseases was unsuccessful in Viet Nam, for various reasons. Venereal diseases are contracted not so much in the rooms of disorderly houses where personal prophylaxis could be, perhaps, carried out effectively, but they are a hazard of the promenades, park benches, dark corners of buildings, etc., and of other odd sites of prostitution where the sailors meet clandestine love. The "officially" sanctioned girls in the establishments of Boulevard Gallieni in Saigon are under the control of a Vietnamese physician, and some of them are examined but once a month. Many of these women are apt to treat themselves with sulfa drugs and penicillin which they obtain in the Vietnam drugstores without prescriptions and for very high prices. The two most frequent infections of the sailors are gonorrhea, which is apt to become chronic, and chancroid, which has yielded to aureomycin. Syphilis is infrequent (?). It is treated in the French Navy with three shots of mercury, then 2-3 million units of penicillin during 8-10 days, and a follow-up series of bismuth injections. Lymphogranulomatosis, which occurs in the Cochinchina-Cambodia sector, appears to be very sensitive to aureomycin.

Malaya now has its independence ("Merdeka"). It is a Federation of eleven states. The local state governments are headed by sultans who, in spite of their picturesque customs, are very modern in their thinking. In the State Executive Council all local rulers are members of the Federal Government. Malaya has a five-year plan for its budget in which about 318.7 million dollars are pro-

jected for social development, education, health and welfare, housing and water supplies. The health program puts emphasis on the erection of Rural Health Centers which will bring medical facilities within the reach of most of the rural population. The planning also includes new hospital buildings and the repair of older treatment facilities.

New Zealand is a welfare state in a minor way. It has a National Health Service in operation. Inhabitants of other Pacific Islands may enter New Zealand on a visitor's permit only, and they may seek medical treatment in the hospitals if they are willing to deposit a substantial sum of money in advance. A resident of Tahiti, suffering from cataract, was requested to deposit a £100 bond for entering the hospital. Another resident of Tonga was demanded to pay £500 before he could have a complete check-up and perhaps an operation.

After the splendid work which foreign missionaries, including medical missionaries have performed in India in the past, it may come to the *expulsion of the missionaries from Nehru's country* as has happened in China. There are many signs of increasing friction. Two states, Madhya Pradesh and Madhya Bharat, appointed special committees to investigate missionary "activities." They are accused of fomenting discontent with the new government. The Committee objected to the distribution of religious literature in hospitals (which act is taken as a form of forced conversion). Of course, the Hindu Committee blames this on the machination of the U. S. government. Even Gandhi protested against Christian "evangelism," saying that no one has the right to try to convert another to his own faith. Christian missionaries in the backward areas also provide social service. Now, the report of the *Madhya Pradesh Government* states that only the government agencies should be allowed to do such a service. New missionaries are not supposed to be let into India, except in unusual cases, while all missionary work should be performed by Indians, announces the Union Government of India.

Indonesia's people had no higher educa-

tion before the beginning of the twentieth century. Dutch colonial politics considered such education chiefly vocational. Hence, university training was provided to produce engineers (1920), lawyers (1924), and physicians. The *Faculty of Medicine* was founded in 1927. The curriculum of these graduate schools was modeled according to Dutch pattern, but the requirements for passing an examination were set much higher. During the Japanese occupation, all institutions of higher learning were closed. The Medical Faculty was opened in April 1943, but, after the declaration of Indonesian Independence in 1945 and with the beginning of fights, the Medical was moved from Djakarta to the interior, to Solo and Klaten. Clinical practice was carried out at Solo, while a pre-clinical institute opened at Klaten in 1946. These towns were attacked by the Dutch, and the students had to man the first-aid posts in the fighting until 1949 when the hostilities ended.

In 1949, the private *University of Gadjah Mada*, earlier founded by the Sultan of Dogja, became a public institution, and it was enlarged with a medical faculty. Medical education also continued at Djakarta at the *University of Indonesia*. There are also a Faculty of Technology at Bandung, and a Faculty of Agriculture and Veterinary Science at Bagor. In November 1954, the *Erlangga University* opened at Surabaya; another one opened in Sumatra. Indonesia needs many doctors since it has now ONE physician for 55,000 persons.

The language of higher instruction is Indonesian, and frequently English. The great difficulty is the *lack of proper textbooks*. Buildings are either lacking or damaged. The teaching hospital for the Dogjarkarta University was finished in May 1955, and the Microbiological Laboratory opened in July 1955. The university instruction is very expensive. Living is costly, and so are books. Student Health Centers were organized everywhere in the university cities where students can get free medical treatment and examination. A sanatorium was set up for tuberculous students at Tjisarua,

and a convalescent home has been planned for students in the hills of Kaliurang.

Besides the five state universities there are also five or six private universities. Altogether, the number of universities and academies of learning has increased from 5 in 1940 to 40 in 1956, with 1,920 lecturers who take care of about 23,000 students.

A *tuberculosis clinic* has been in operation in *Sapkyo Myun*, a rural district of *Korea*, about 100 miles SW of Seoul. It gives service to a population of about 20,000. The total number of tuberculous patients in South Korea is estimated at 1,500,000, of whom 500,000 need hospitalization, but the total number of beds available in sanatoria and hospitals is not over 5000. About 100 chest clinics have been established since 1954 by the Ministry of Health for the diagnosis and treatment of tuberculous patients on an outpatient basis. The Sapkyo Clinic can take care of the tuberculous cases in the neighboring area. X-ray examinations are performed at the nearest provincial hospital at Hong Sang where the x-ray films are read biweekly by an Australian radiologist. The clinic itself is under the supervision of an American public-health nurse who is assisted by two Korean nurses and an interpreter. The treatment consists of streptomycin injections and INH tablets orally. The U. S. Army is now building and equipping a 150-bed hospital which will be the teaching center for thoracic surgery and radiology in South Korea.

By the way, Australian radiologists! The *first School of Radiology* has been established in Australia at the Royal Prince Alfred Hospital in *Sydney*. It opened on 1 March, 1957. It will provide a two-year training in radiodiagnosis and radiotherapy according to British and American fashion.

New Caledonia and its dependencies have a population of about 65,000 (3 persons per

square kilometer). Only 50% of the population is native. The climate is very healthful. The natives are particularly susceptible to newly imported diseases such as influenza and tuberculosis. The *health efforts* are concentrated at Noumea, at the Colonial Hospital built by the French. There is also a new leprosarium at Ducos. Other medical establishments are a Pasteur Institute, a Medical School Center, and a Municipal Health Department. In the country there is an 18-bed hospital at Bourail, and 9 dispensaries on the smaller islands. A tuberculosis sanatorium was built 25 miles away from Noumea, at the Pirogue Mountain. New Caledonia also has a real *spa* at *La Crouen* which opened last year. Its sulfate waters are compared with those of Amélie-les-Bains in France, and their almost miraculous effect attracts many rich rheumatic Australians.

Somewhere in *New Guinea*, at the fringe of the Kukukuku country, a primitive group of natives are living. They are the *Foreas*. Medical officers detected a new disease among this people. It is a fatal disease whose victims are mostly women. The disease had been known among the natives for more than 30 years. They call it "karu." For better study, the medical officer took two women with him to Port Moresby, but he had to tell the people that if the women die he will bring their dead bodies back. The Foreas are known to have *dead bodies as their staple diet*.

Smoking in a foodshop is now an act punishable by a fine according to the new Food and Hygiene Regulation of Great Britain. A baker was fined £5. because the health inspector found him standing at a bench in his shop, with a cigarette in his mouth. Another employee was fined £1. because of smoking while taking inventory in a food room. Admirable superlative of sanitary regulation! MERRY CHRISTMAS! . . . *Multa paucis!*

The Sir Henry Wellcome Medal and Prize

COMPETITION FOR 1958

THE competition is open to all medical department officers, former such officers, of the Army, Navy, Air Force, Public Health Service, Veterans Administration, The National Guard and the Reserves of the United States, commissioned officers of foreign military services, and all members of the Association, except that no person shall be eligible for a second award of this medal and prize and no paper previously published will be accepted.

The award for 1958, a medal, a scroll, and a cash prize of \$500, will be given for the paper selected by a committee composed of the Association's vice-presidents which reports on the most useful original investigation in the field of military medicine. The widest latitude is given this competition, so that it may be open to all components of the membership of the Association. Appropriate subjects may be found in the theory and practice of medicine, dentistry, veterinary medicine, nursing and sanitation. The material presented may be the result of laboratory work or of field experience. Certain weight will be given to the amount and quality of the original work involved, but relative value to military medicine as a whole will be the determining factor.

Each competitor must furnish six copies of his paper which must not be signed with the true name of the author, but are to be identified by a *nom de plume* or distinctive device. These must be forwarded to the Secretary of the Association of Military Surgeons of the United States, Suite 718, 1726 Eye St. N.W., Washington 6, D.C., so as to arrive at a date not later than 1 July 1958, and must be accompanied by a sealed envelope marked on the outside with the fictitious name or device assumed by the writer and enclosing his true name, title and address. The length of the essays is fixed between a maximum of 10,000 words and a minimum of 3000 words. After the winning paper has been selected the envelope accompanying the winning essay or report will be opened by the Secretary of the Association and the name of the successful contestant announced by him. The winning essay or report becomes the property of the Association, and will be published in *MILITARY MEDICINE*. Should the Board of Award see fit to designate any paper for "first honorable mention" the Executive Council may award the writer life membership in The Association of Military Surgeons, and his essay will then also become the property of the Association.

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ASSOCIATION NOTES

Timely items of general interest are accepted for these columns. Deadline is 3rd of month preceding month of issue.

Department of Defense

Ass't Secretary (Health & Medical)—HON. FRANK B. BERRY, M.D.

Deputy Ass't Sec'y—HON. EDW. H. CUSHING, M.D.

SELECTIVE SERVICE

The Selective Service has been requested to furnish 7,000 men for the Armed Forces for the month of December.

Army

Surgeon General—MAJ. GEN. SILAS B. HAYS

Deputy Surg. Gen.—MAJ. GEN. JAMES P. COONEY

TO FLAG RANK

Dr. Thomas W. Mattingly, who was recently assigned as Chief of the Department of Medicine at Walter Reed Army Hospital, has been promoted to Brigadier General.

General Mattingly, whose specialty is cardiology, has been one of the consultants to General Snyder, the White House physician.

General Mattingly is a native of Maryland and a graduate of Georgetown University Medical School where he is now clinical Assistant Professor of Medicine.

ASSIGNMENTS IN SGO

Capt. Echols A. Hansbarger, Jr., MC, has been assigned to the Induction Appointment Branch, Physical Standards Office, Profes-

sional Division, Office of the Surgeon General.

Capt. David E. Sullivan, MSC, has been appointed as administrative officer in the Induction and Appointment Branch, Office of the Chief, Physical Standards.

ASSIGNMENT AT WRAH

Colonel Doss O. Lynn has been named Assistant Chief of the Department of Medicine at Walter Reed Army Hospital. Brig. General Thomas W. Mattingly has been named the Chief of the department in addition to his duties as Chief of the Cardiology Service.

Colonel Lynn has just completed a two-year tour in Landstuhl, Germany. He is a graduate of the University of Oklahoma.

APPOINTMENT

Brig. General Joseph M. Bosworth, Jr., Medical Corps, U. S. Army, Reserve, Commander of the 30th Hospital Center, Atlanta, Ga., is a new member of the Advisory Council on Reserve Affairs to the Surgeon General of the Army.

During World War II he was a flight surgeon and became surgeon at a fighter pilot school where Chinese pilots were trained. He also helped establish three Army hospitals. He is a graduate of Emory University Medical School.

HONORED

Col. Joe M. Blumberg, MC, U. S. Army, Deputy Director of the Armed Forces Institute of Pathology, has been elected Vice-president of the American Society of Clinical Pathologists.

Prior to his present assignment Colonel Blumberg was Chief of the 406th Army Medical Laboratory in Japan.

TO CLOSE

Murphy Army Hospital, Waltham, Mass., is scheduled to close, effective January 1958. This is a Class II installation under the jurisdiction of The Surgeon General.

Navy

Surgeon General—REAR ADM. BARTHOLOMEW W. HOGAN

Deputy Surgeon General—REAR ADMIRAL BRUCE E. BRADLEY

HOSPITAL ADMINISTRATION SCHOOL

Commander Leo J. Elsasser, MSC, has been appointed as the new Commanding Officer of the Naval School of Hospital Administration, Bethesda, Maryland. He had been the Director of the Hospital Administration Division at the Bureau of Medicine and Surgery. In addition to this new assignment Commander Elsasser will continue to serve as Consultant to the Bureau on Hospital Administration matters.

The former commanding officer, Commander Charles L. Crawford, MSC, has been reassigned as Executive Officer of the Hospital Corps School, San Diego, Calif.

RETIRED

The following Medical Service Corps Officers were placed on the retired list, effective November 1: Cdr. Shelly Lewis; LCdrs Edward Dominquez, William F. C. Whalen, Richard V. Whaley; Lts. James M. DeAtley and James D. Kelly.

Air Force

Surgeon General—MAJ. GEN. DAN C. OGLE
Deputy Surg. Gen.—MAJ. GEN. OLIN F. MCILNAY

SPECIALTY TRAINING

Supervision of all specialty training in aviation medicine, throughout the Air Force, has been given to the School of Aviation Medicine at Randolph Air Force Base.

The School will oversee the advanced

phases of a five-year program to develop qualified specialists, provided by major air commands in the United States and abroad.

Hitherto, the School has offered one year of study in the specialty, has worked closely with civilian universities on another academic year, and has monitored residences for medical officers after the first two years.

Under a newly announced decision by Air Force Headquarters, the School also will oversee the final two years of supervised medical practice, in twelve commands ranging from Alaska to Germany.

It will conduct this training as the designated representative of the Surgeon General.

Maj. Gen. Otis O. Benson, Jr., as Commandant of the School, will be responsible for the program.

The effect of the order is to make the progress of candidates for certification a primary concern of the School, where techniques in aviation medicine were mainly conceived and developed.

It is one more step in the concentration of Air Force medical activities in the School, on the eve of its move to a new \$10,000,000 plant, now building at Brooks AFB, Texas.

Public Health Service

Surgeon General—LEROY E. BURNEY, M.D.
Deputy Surg. Gen.—JOHN D. PORTERFIELD, M.D.

APPOINTMENT

Dr. James V. Lowry was recently appointed Deputy Chief of the Bureau of Medical Services in the Public Health Service, with the rank of Assistant Surgeon General. He has been Medical Officer in Charge of the Public Health Service Hospital, Lexington, Ky.

The Bureau of Medical Services administers the Public Health Service Hospitals, the Indian Health Service, Foreign Quarantine, the Hospital Survey and Construction program, and research activities concerned with the Nation's dental and nursing resources.

Dr. Lowry is a native of Wisconsin and

a graduate of the University of Wisconsin. He has been in the Public Health Service since 1937.

APPOINTMENT

Robert D. Coghill, an organic chemist who was formerly Director of Research of Abbott Laboratories has been appointed Special Assistant for Industrial Research at the Cancer Chemotherapy National Service Center, National Cancer Institute.

In this position he will be responsible for the industrial aspects of the national program of cancer chemotherapy research initiated to develop chemicals that will destroy cancer.

INFLUENZA

Increasing amounts of the Asian type of influenza vaccine have been made available. Recently the strength of the vaccine has been increased.

The respiratory disease rate during these fall months has been high and probably many cases have been diagnosed as Asian type of influenza. The diagnosis is one that is difficult to prove since laboratory methods must be used to confirm the diagnosis. However, a person with a temperature of 103 or 104 F., with the severe backache, and generalized aching can for all practical purposes be considered to have influenza whether of the Asian or another type. As has been said by one of the visiting nurses, "You don't have to tell them to go to bed, they are there when you arrive."

Since there is no specific remedy for influenza we should encourage the use of the vaccine, even though the report is that it is about 60% effective.

There is another fact that should be considered and that is that we can reasonably expect influenza in the fall of 1958. By that time there will be a goodly supply of vaccine and people could be immunized much earlier than they were this year.

X-RAYS

X-ray examination in the case of the new-

born and pregnant women should be restricted. There should be a definite indication and not a routine use of this method of examination. This is the opinion of the Children's Bureau of which Katherine Brownell Oettinger is Chief.

TUBERCULOSIS

The Public Health Service has reported that the number of active tuberculosis cases in the United States has declined 30% in the last five years. While this is encouraging it has been pointed out that there are still active tuberculosis cases that have not been reported.

Tuberculosis is a disease that is ever with us and requires that we keep our guard up. Ferreting out the active cases and getting them under treatment is a highly important preventive measure. Only through a vigorous campaign inaugurated early in this century have we been able to reduce the mortality and morbidity of this ever present disease.

BCG VACCINE

Mass vaccination with BCG to control tuberculosis is opposed by the Public Health Service. In releasing the report the following statement was made: "BCG has been used in tuberculosis immunization for more than 30 years, and has had broad acceptance in certain European nations. There has been and still is wide variance of opinion as to its precise value, even in some of the countries that have been using BCG vaccine for many years. The committee points out that studies have shown the effectiveness of BCG ranges from 0 to 80%. Because of this wide range, the committee recommends against large-scale vaccination programs in this country."

RETIRED

The following Commissioned Officers of the Public Health Service have been retired: Richard P. Long, Senior Sanitary Engineer; Philip H. McCaul, Dental Surgeon; Arthur W. Newitt, Medical Director; Edna C. Eppler, Junior Assistant Nurse Officer.

Veterans Administration

Chief Medical Director—WILLIAM S. MID-
DLETON, M.D.

Deputy Chief Med. Dir.—R. A. WOLFORD,
M.D.

SCHIZOPHRENIA

The relationship between body chemistry and schizophrenia is being studied at the Veterans Administration Hospital in Bedford, Mass.

Biochemist Aniela S. Zygmuntowicz and Dr. Charles C. Colburn, research chief, have been doing studies on the quantity of steroids produced by mentally ill patients. They have found that in schizophrenics, the body's production of corticosteroids goes through abnormal altering periods of high and low production, without regard for stresses and strains on the patient.

Miscellaneous

PHYSICIAN NEEDED

Dr. George Loewenstein, the resident physician of the Town of Islesboro is forced to resign because of ill health. The town is in urgent need of a good general practitioner on, or before, January 1958.

Information may be had by contacting Ellis A. Reeby, Town Manager of Islesboro, Maine.

TUBERCULOSIS

Bed rest in pulmonary tuberculosis is considered a basic requirement in the treatment of that disease according to a Subcommittee of the American College of Chest Physicians.

The importance of bed rest has been de-emphasized in some areas whereas chemotherapy has been emphasized.

The Sub-committee believes that bed rest should be maintained until the lesion is

stabilized, as indicated by bacteriologic, x-ray, and clinical evidence. The committee also wishes to reaffirm the desirability of at least starting the patient's care under sanatorium conditions for the purpose of patient indoctrination, the evaluation of his clinical problem, and the initiation of the various therapies.

GORGAS MEMORIAL INSTITUTE

At the annual meeting of the Gorgas Memorial Institute of Tropical and Preventive Medicine, held recently in Washington, D.C., the following officers were elected: Col. Joseph F. Siler, U. S. Army, Retired, President Emeritus; Dr. Walter A. Bloedorn, President; Mr. Maurice H. Thatcher, Vice-president and General Counsel; Dr. Louis L. Williams, Secretary; Mr. Hulbert T. Bisselle, Treasurer; Mr. Donald A. McCormack, Ass't. Treasurer.

Honor Roll

Since the publication of our last list, the following sponsored one or more applicants for membership in the Association:

Brig. Gen. John F. Bohlender, MC, USA
Major Solomon Broyde, DC, USAR
Capt. Wilson P. Couch, MC, USAR
Lt. Col. Walter Denning, MC, Mass. NG
Major Paul H. Ellis, MSC, USA
Col. Paul R. Hildebrand, MC, Colo. NG
Asst. Surg. Gen. R. B. Holt, USPHS
Major Hugo R. Kirsten, MSC, USAR
Col. Amos R. Koontz, MC, Md. NG
Col. Frances Lay, USAF (NC)
Col. Homan Leech, MC, USA
Lt. Col. Virginia B. Lester, ANC, Res.
Capt. Paul A. Lindquist, USPHS
Major W. H. Lockwood, MC, USAR
Rear Adm. H. Lamont Pugh, USN, Ret.
Major Gen. Paul I. Robinson, MC, USA
Arthur R. Turner, M.D.
Mrs. M. Marias Wood
Col. L. P. Zagelow, USAF (MSC)

O B I T U A R I E S

Col. Francis M. C. Usher, U. S. Army, Ret.

Francis M. C. Usher, Colonel, U. S. Army, Retired, died at Houston, Texas, on September 7 at the age of 88.

Colonel Usher was born on a farm near Moscow, Kentucky, January 19, 1871. He attended the Kentucky Military Institute, Vanderbilt University, and then the University of Pennsylvania where he received his medical degree in 1892. He interned at Johns Hopkins Hospital.

Before entering the U. S. Army Medical Corps in 1898 Colonel Usher practiced medicine in Missouri. During his twenty years in the Army he saw service in the Philippines and China. He was retired from the military service in 1918 for physical disability. During his retirement he turned to a hobby of invention and succeeded in obtaining twelve patents.

Colonel Usher is survived by his wife, Mrs. Kate Usher of San Antonio, Texas; a son, Dr. Francis C. Usher of Houston; and

one daughter, Miss Kate Usher of Washington, D.C.

Capt. Roy F. Cantrell, MC, U. S. Navy

Roy Foster Cantrell, Captain, Medical Corps, U. S. Navy, died on October 1, at the Naval Hospital, Oakland, Calif., at the age of 60.

He was a native of Arkansas. After receiving his medical degree from the University of Oklahoma in 1928 he was commissioned in the Medical Corps of the Navy. During his more than 29 years of service with the Navy Medical Department he served in the United States, abroad, and on board ships of the fleet. His last assignment was Commanding Officer, U. S. Naval Dispensary, San Francisco.

Captain Cantrell is survived by his wife, Mrs. Bernice Kemphill Cantrell, and their son, Doctor James Randall Cantrell.

Interment was at Arlington National Cemetery.



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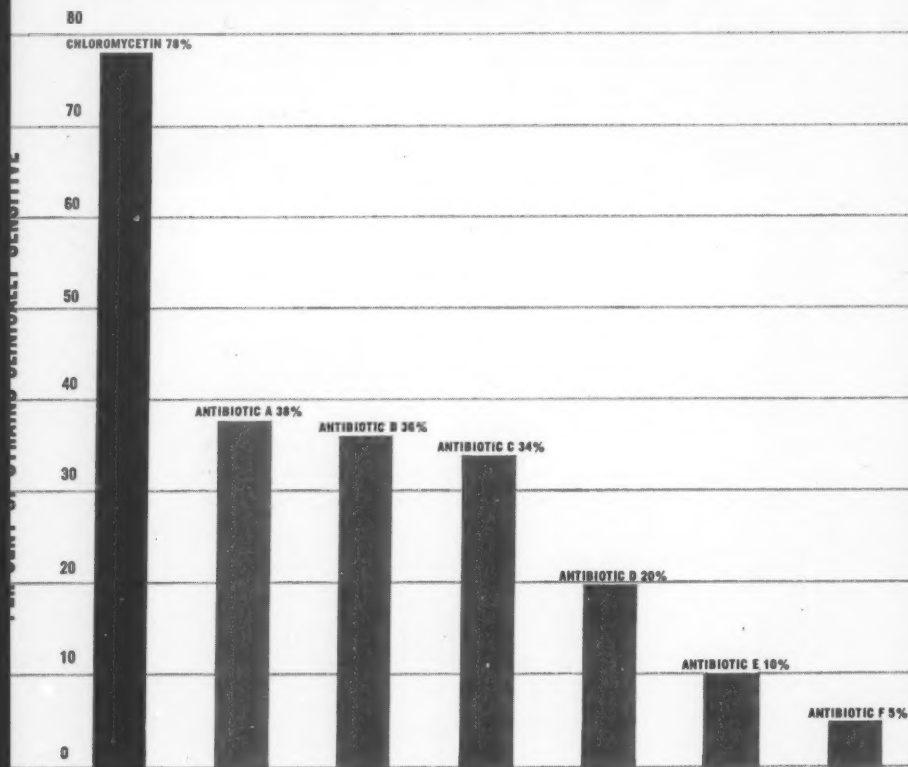
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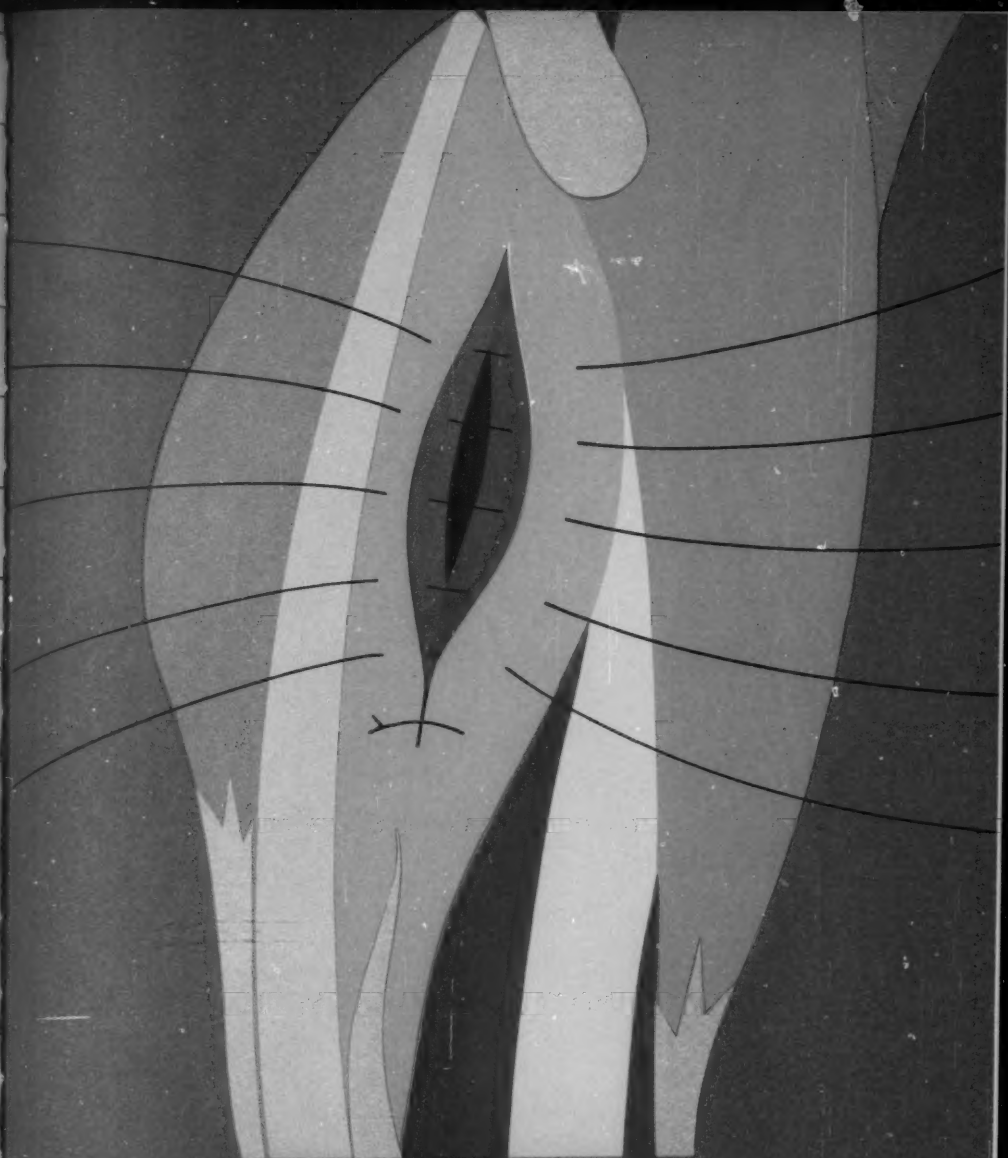
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*This graph is adapted from Waishren, B. A., & Strelitzer, C. L.: *Arch. Int. Med.* 99:744, 1957. It represents *in vitro* data obtained with strains isolated from patients between the years 1951 and 1956. Inhibitory concentrations, ranging from 3 to 25 mcg. per ml., were selected on the basis of usual clinical sensitivity.

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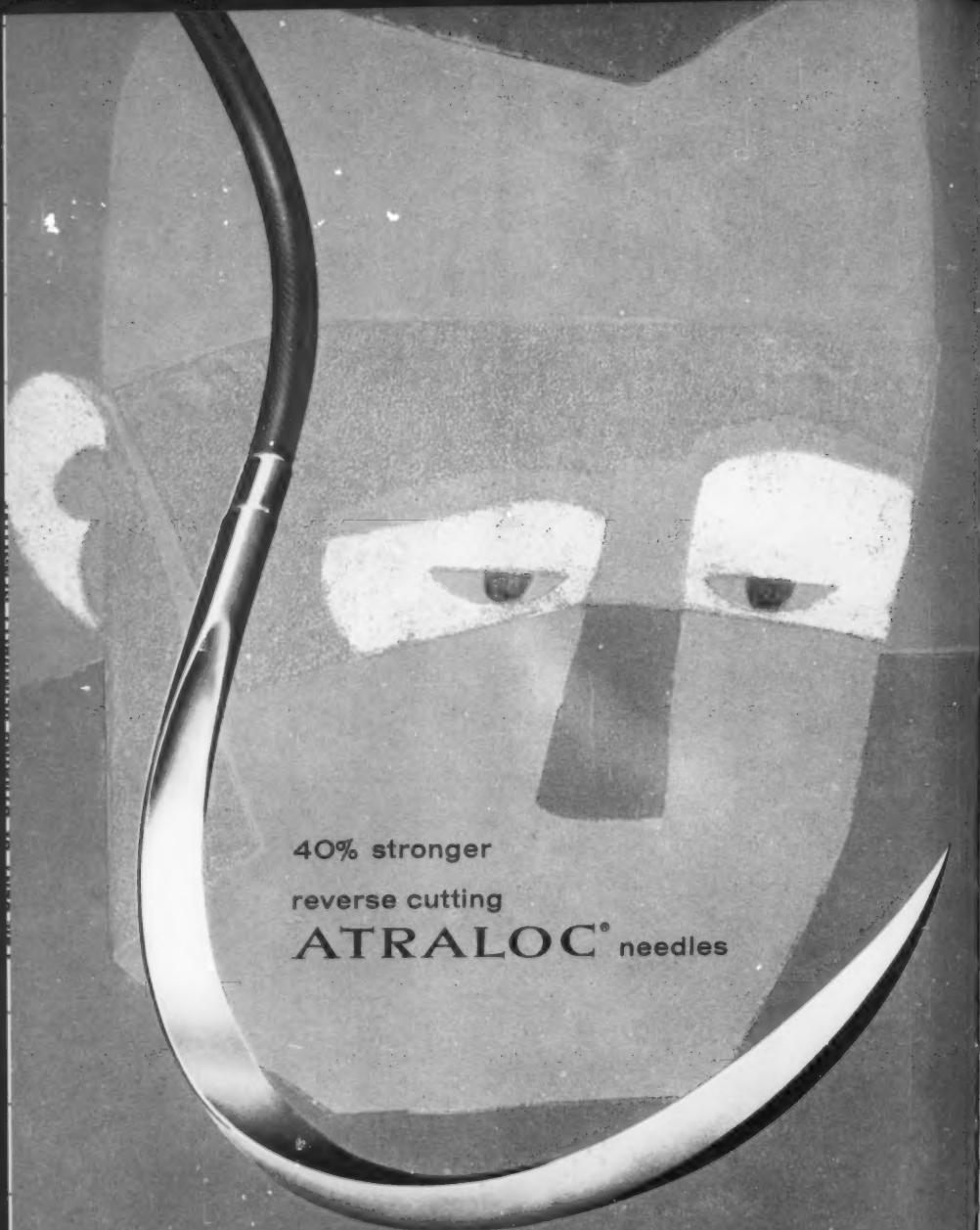




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Editor:

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U. S. Army Ret.

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¹. Miller, J. M.; Surmonte, J. A.; Ginsberg, M., and Ablondi, F. B.: Streptokinase Intramuscularly in the Treatment of Infection and Edema. (Scientific Exhibit) *Postgraduate Medicine* Vol. 20, No. 3: 260-267 (Sept.) 1956.

Postgraduate Medicine

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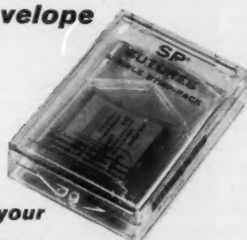
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References: (1) Brown, E. B., and Moore, C. V., in Tocantins, L. M.: *Progress in Hematology*, New York, Grune & Stratton, Inc., 1956, vol. 1, p. 25. (2) Gaisford, W., and Jennison, R. F.: *Brit. M. J.* 2:700 (Sept. 17) 1955. (3) Wallerstein, R. O.: *J. Pediat.* 49:173, 1956. (4) Sturgeon, R.: *Pediatrics* 18:267, 1956. (5) Jennison, R. F., and Ellis, H. R.: *Lancet* 2:1245 (Dec. 18) 1954. (6) Scott, J. M., and Govan, A. D. T.: *Brit. M. J.* 2:1257 (Nov. 27) 1954. (7) Grunberg, A.,

Clinical improvement paralleled this response. Premature infants and surgical cases were similarly benefited. IMFERON gave "...all the advantages of transfusion or intravenous therapy without the disadvantages."² There were no side effects in any of the infants treated. Wallerstein³ confirmed these results, furnishing evidence that IMFERON is well absorbed and appears in the bone marrow 12 to 24 hours after injection. Results are equal to those with intravenous saccharated iron oxide without the unpleasant side effects. Sturgeon⁴ showed that the first year's iron requirements in infancy can be supplied with three injections of IMFERON.

Iron Deficiency Anemia of Pregnancy: Nausea precludes oral iron therapy in many anemic pregnant women. In those with severe anemia who are first seen late in pregnancy, prompt hemoglobin regeneration is unobtainable with oral iron. IMFERON produced prompt hemoglobin responses in anemia of pregnancy,^{5,6} the results being similar to those obtained with intravenous saccharated iron oxide. Side effects were virtually absent with IMFERON.^{5,6}

Resistant Hypochromic Anemia: Patients who do not respond to oral iron, those who cannot take oral iron and those with gastrointestinal pathology respond well to injections of IMFERON.⁷⁻¹¹ While oral iron is of little value in treating the anemia of rheumatoid arthritis, IMFERON is "...as beneficial as intravenous iron and easier to administer."⁸

Present Studies: Published reports and recent findings of clinical investigators confirm the effectiveness and safety of IMFERON for hemoglobin regeneration and creation of iron stores. More than 70 studies are now being completed in the United States. Reports stress prompt hemoglobin response, ease of administration and freedom from side effects. Clinicians desiring additional information should request Brochure No. NDA 17, IMFERON, Lakeside Laboratories, Inc., Milwaukee 1, Wisconsin.

and Blair, J. L.: *A.M.A. Arch. Int. Med.* 96:731, 1955. (8) Millard, J. B., and Barber, H. S.: *Ann. Rheumat. Dis.* 15:51, 1956. (9) Baird, I. M., and Podmore, D. A.: *Lancet* 2:942 (Nov. 6) 1954. (10) Cappell, D. F.; Hutchinson, H. E.; Hendry, E. B., and Conway, H.: *Brit. M. J.* 2:1255 (Nov. 27) 1954. (11) Stevens, A. R.: *A.M.A. Arch. Int. Med.* 96:550 1956.

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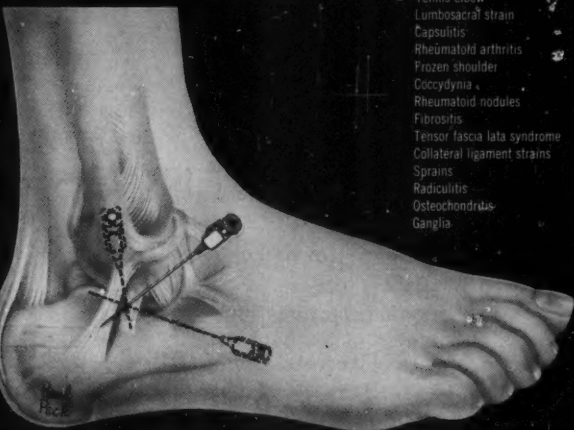
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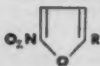
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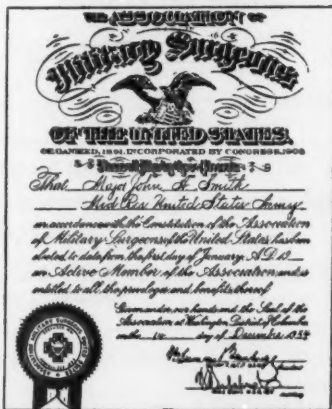
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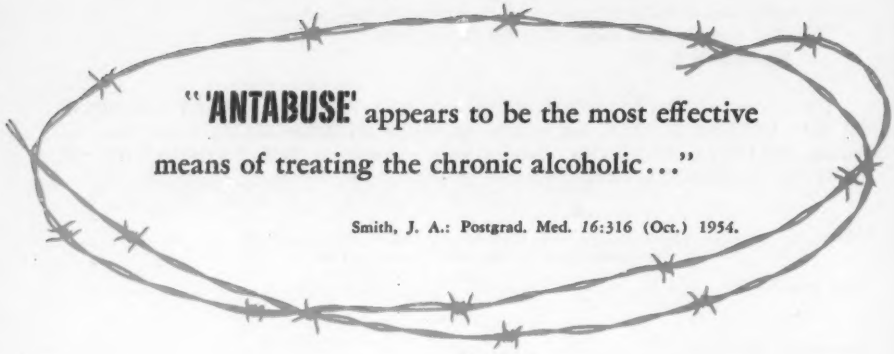
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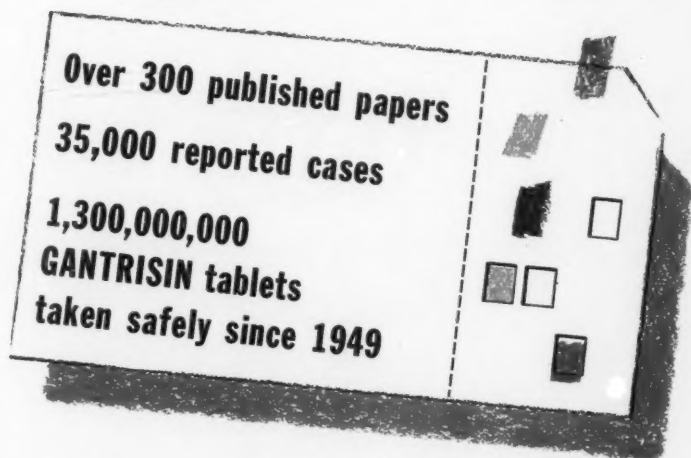
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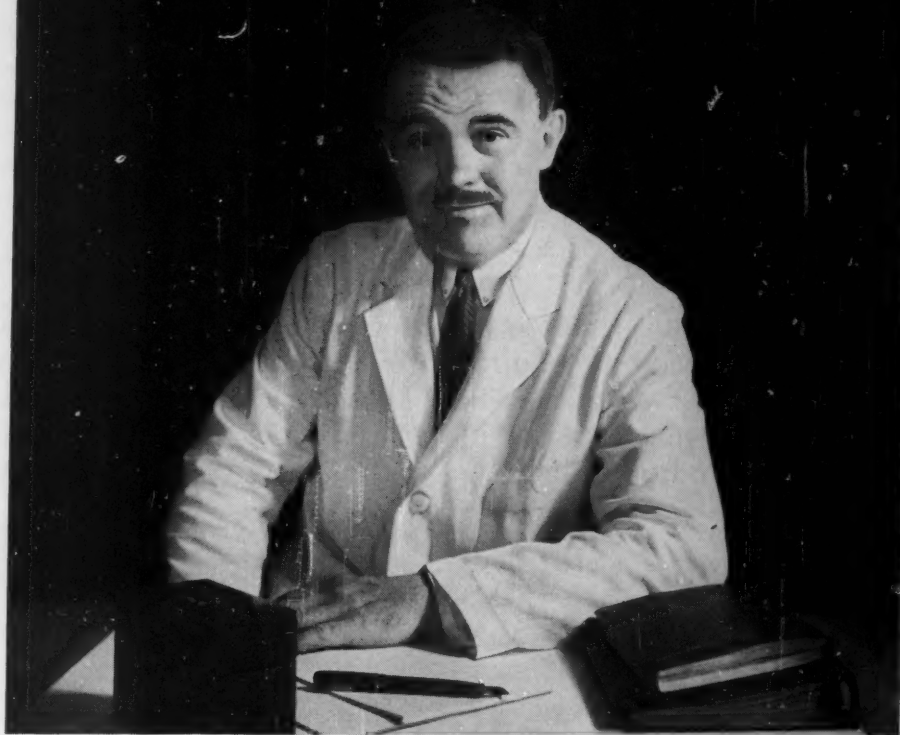
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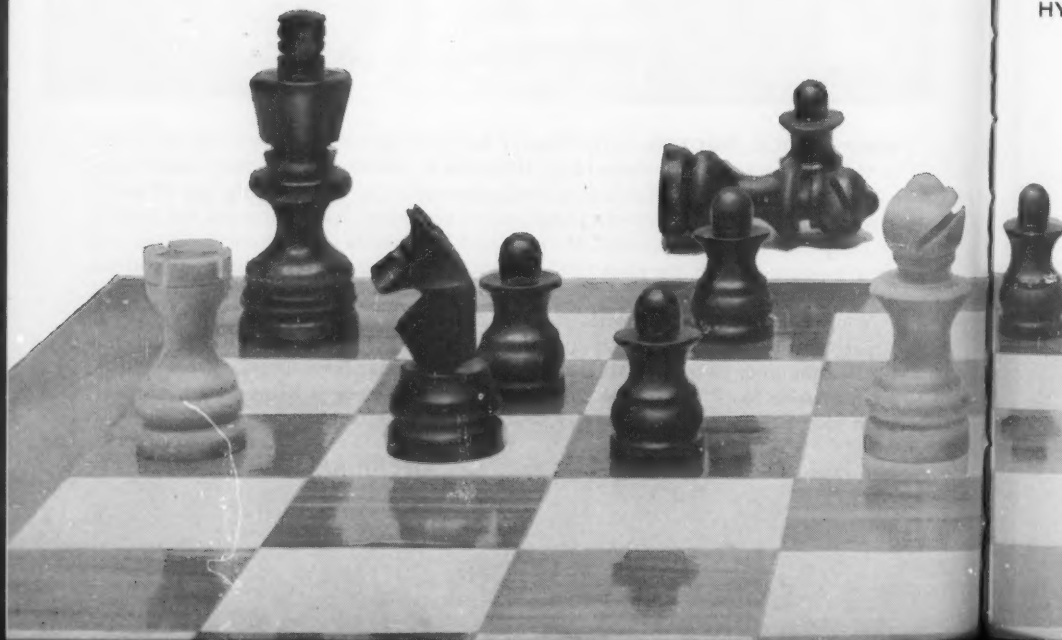
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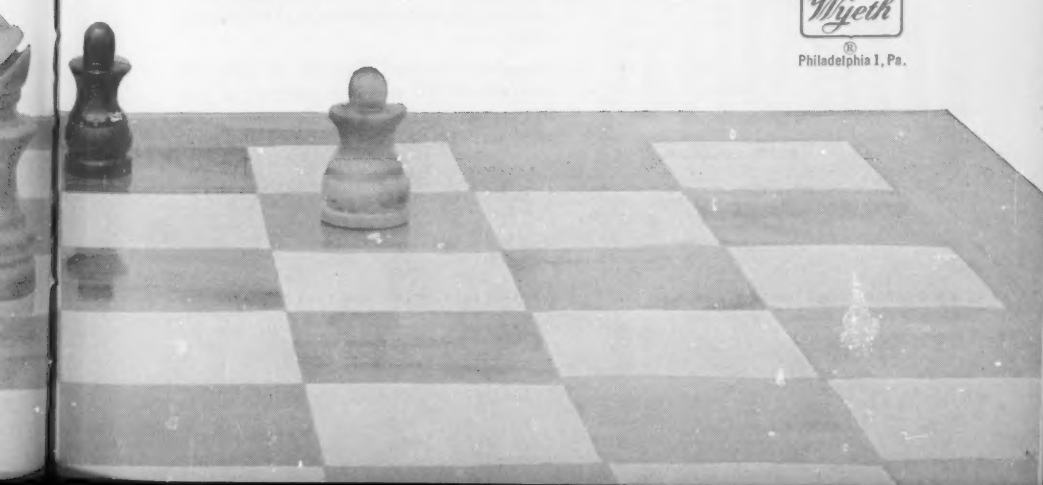


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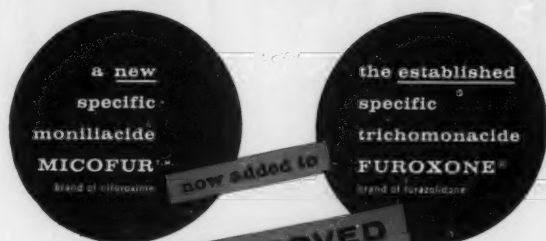
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1. Goodman, L. S. and Gilman, A.: *The Pharmacological Basis of Therapeutics*, Ed. 2, The Macmillan Co., New York, 1955, p. 856.



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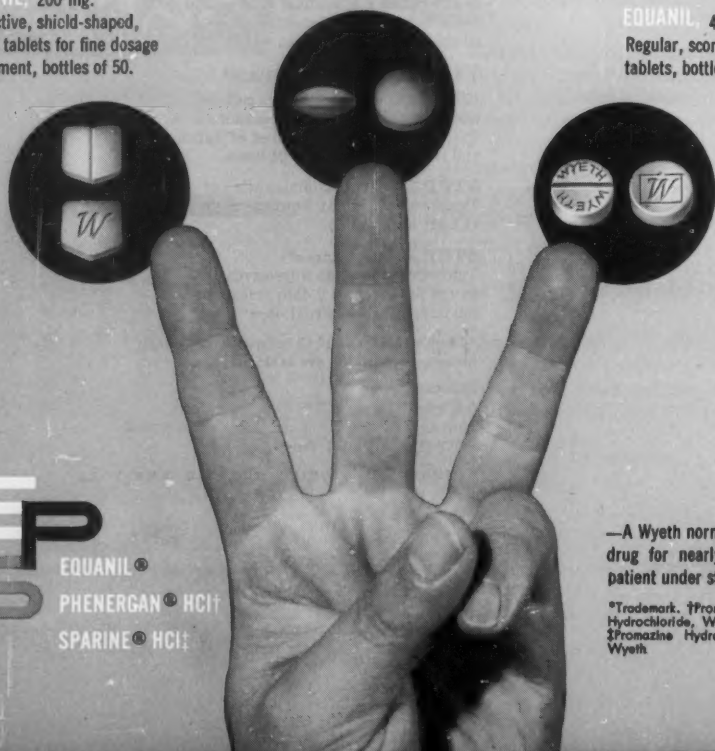
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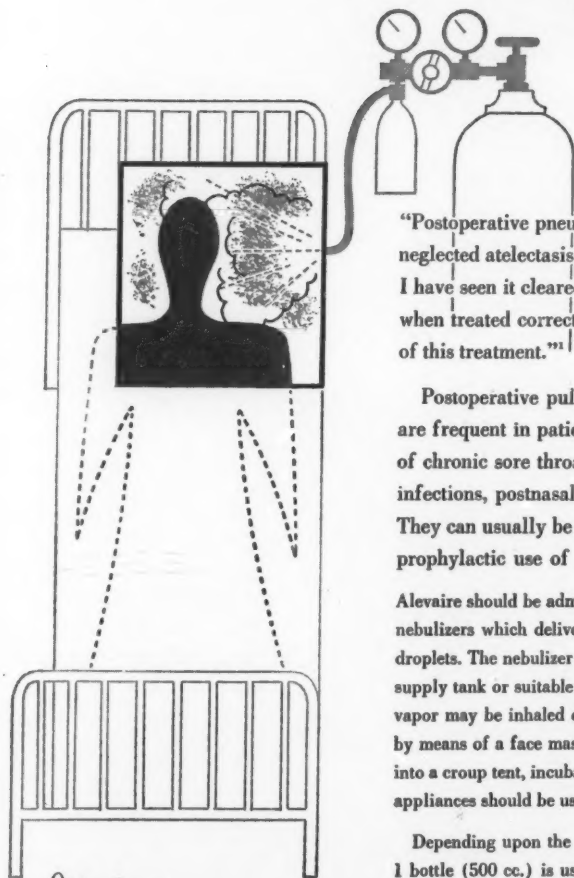
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